

13 MOUNTAIN STREET & 19-23 ELM STREET PROPOSED REDEVELOPMENT - TRANSPORTATION CONSIDERATIONS STUDY

Official Plan Amendment and Zoning By-law Amendment Application
Town of Grimsby



Prepared For: Woolverton Holdings Corp.

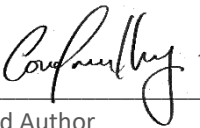
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1.0 INTRODUCTION

BA Group is retained by Woolverton Holdings Corp. to provide transportation consulting services related to an Official Plan Amendment ('OPA') and Zoning By-law Amendment ('ZBA') application being made to the Town of Grimsby to permit a mixed-use development (the 'Project') on the lands municipally known as 13 Mountain Street, 19 Elm Street, 21 Elm Street and 23 Elm Street (the 'site').

A portion of the site (13 Mountain Street and 19-21 Elm Street) previously received Official Plan and Zoning By-law amendment approval through a settlement with the Town of Grimsby at the Ontario Land Tribunal in February 2024. That approval, permit a 7-storey development with 120 residential units for this portion of the site. The owners acquired 23 Elm Street following the previous settlement approval and are now looking to update the permissions for the site as a whole for an 8-storey residential building.

The development proposal consists of 177 purpose built rental residential units (a portion of the units are provided as affordable housing), 279 m² of retail uses, and 450 m² of community hub uses. The development proposal also includes 150 parking spaces (excluding the 6 tandem parking spaces, and including 2 car-share spaces), 56 bicycle parking spaces and one (1) loading space. All vehicular access is provided from a consolidated access off Mountain Street. To note, there are planned Regional Road right-of-way improvements along Mountain Street which includes a widening of 4.25 metres.

This report provides an update to the OPA and ZBA application and reviews the urban transportation considerations of the revised development concept plan.

1.1 Existing Site

The site is located in the Town of Grimsby in the Niagara Region, on the northeast corner of the Mountain Street / Elm Street intersection. The site is bound by neighbouring commercial properties to the north, Elm Street to the south, a commercial parking lot and neighbouring residential building to the east, and Mountain Street to the west.

The site is currently occupied by six buildings/structures comprised of residential uses and commercial uses. Four surface parking lots (39 spaces) are provided on the site today to service the site today with vehicular access from four driveways (two driveways from Mountain Street and two accesses from Elm Street). In addition to the 39 on-site parking spaces there are three (3) parking spaces provided off site within the adjacent neighbouring public parking lot located to the east of the site. The site location is illustrated on **Figure 1** while the site context is illustrated on **Figure 2**.

1.2 Background

Byway of context, an OPA and ZBA applications for a portion of the site were previously submitted to the Town of Grimsby in May 2021, September 2021, January 2022, and December 2023. The original application was filed for 13 Mountain Street and 19 Elm Street and later included 21 Elm Street at the Ontario Land Tribunal (OLT).

- May 2021 (Submission #1):
 - The initial application proposed 74 residential units and 462 m² of non-residential GFA. BA Group submitted the "13 Mountain Street & 19 Elm Street, Proposed Redevelopment – Transportation Considerations Study" (May 27, 2021), which assessed the multi-modal transportation impact of the development.
- October 2021 (Submission #2):
 - A revised concept plan was submitted to satisfy Regional and Town staff comments. Transportation-related elements remained largely consistent with the May submission. BA Group prepared a report titled "13 Mountain Street & 19 Elm Street, Proposed Redevelopment – Transportation Considerations Study Update 1" (October 27, 2021).



- January 2022 (Submission #3):
 - A letter was submitted to council to provide a detailed assessment of the site’s proposed parking supply in response to agency comments. BA Group prepared a letter titled *“Parking Rationale for 13 Mountain Street and 19 Elm Street”* (January 24, 2022) provided a detailed assessment of proposed parking provisions.
- December 2023 (Submission #4):
 - This OPA/ZBA application included an expanded site incorporating 21 Elm Street, an increased residential unit count, and increased non-residential GFA. BA Group prepared a report titled *“13 Mountain Street & 19 Elm Street, Proposed Redevelopment – Transportation Considerations Study Update 2”* (December 7, 2023) reflecting these revisions.
 - This application was approved through a settlement with the Town of Grimsby at the OLT in December 2023. The final order was issued by the OLT in February 2024.

1.3 This Transportation Study

A new OPA / ZBA application is now being made for the site to reflect the revised development proposal. The key changes since the previous OPA / ZBA applications have been made include the inclusion of 23 Elm Street property as part of the site, and includes changes to the development programme. BA Group has undertaken a review of the key transportation-related aspects (i.e. traffic, parking, loading, and bicycles) of the proposed Official Plan Amendment and Zoning By-law Amendment application being submitted to the Town of Grimsby to permit the proposed development at 13 Mountain Street and 19-23 Elm Street. Key aspects reviewed include:

Development Plan

- A review of the proposed building programme; and
- A review of the transportation elements of the proposed development plan including site pedestrian and vehicular access, vehicular and bicycle parking facilities, and loading facilities

Transportation Context

- A review of the existing and future transportation context of the site considering area road network, area transit services, the surrounding pedestrian environment, and the area cycling network; and
- A discussion related to the existing area travel characteristics.

Site Planning

- A review of the proposed building programme; and
- A review of the transportation elements of the proposed development plan including site pedestrian and vehicular access, vehicular and bicycle parking facilities, and loading facilities

Multi-Modal Considerations

- A review of area transit, pedestrian, and cycling context today;
- An outline of multi-modal travel demand projections for the proposed development based on prevailing Institute of Transportation Engineers (ITE) trip rates; and
- A discussion related to future site pedestrian, transit, and cyclist activity generated by the proposed development.

Traffic Overview

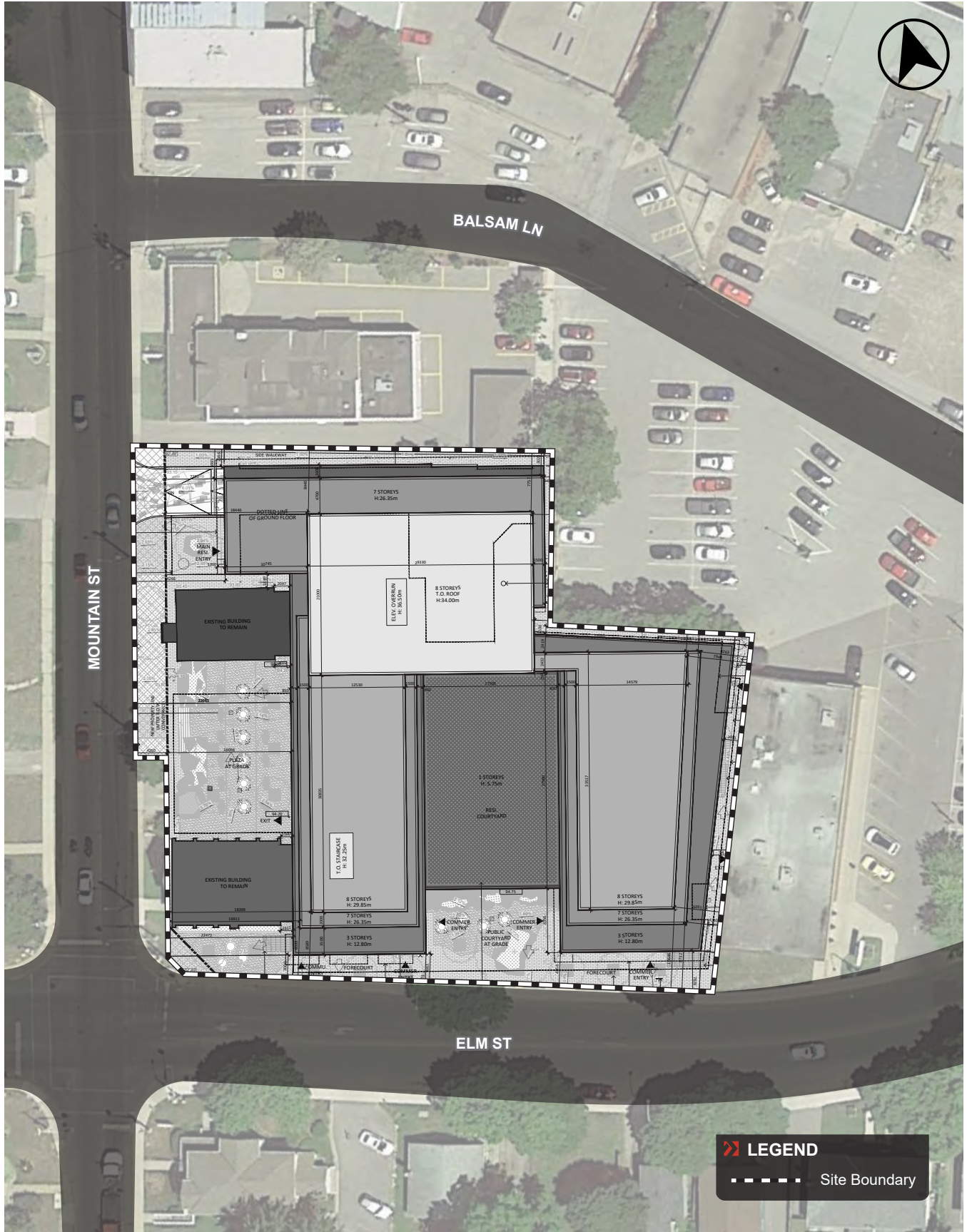
- Development of new site-related traffic forecasts and assignments reflecting the proposed development plan; and
- A brief assessment of traffic volume changes on the area street network.

The findings of our report are summarized in the following sections.





FIGURE 1 SITE LOCATION



2.0 PROPOSED DEVELOPMENT

The proposed development is comprised of a mixed-use development, which includes 177 purpose built rental units (a combination of affordable and market rate units), 450 m² of community hub uses and 279 m² of retail uses. Reduced scale architectural plans of the proposed development are provided in **Appendix A**.

Table 1 summarizes the current development concept plan.

Table 1 Proposed Development Program

Use		Development Proposal
Property		13 Mountain Street, 19 Elm Street, 21 Elm Street & 23 Elm Street
Lot Area		4,513 m ²
Residential Units	Studio	21 units
	1-bedroom	24 units
	2-bedroom	102 units
	3-bedroom	30 units
	Total	177 units ²
Non-Residential Use	Retail	279 m ² of GFA
	Community Hub	450 m ² of GFA
Vehicle Parking	Residential	121 spaces ³
	Car-share	2 spaces
	Non-Residential	27 spaces ⁴
	Total	150 spaces ⁵
Bicycle Parking	Residential (Long-Term)	54 bicycle spaces
	Non-Residential (Short-Term)	2 bicycle spaces
	Total	56 bicycle spaces
Loading		1 space (3.5 x 9.0 x 6.1m)
Site Access		Driveway on Mountain Street

Notes:

1. Current concept plan site statistics are based upon site plans prepared by Studio JCI, dated May 16th, 2025.
2. Includes 18 affordable rental units (10% of total unit supply).
3. Excluding 6 tandem parking spaces
4. Shared parking between commercial and visitor uses.
5. Including 6 accessible parking spaces.



2.1 Site Access and Circulation

2.1.1 Pedestrian Access

The primary pedestrian access for the residents of the building is proposed along Mountain Street, located at the northwest corner of the site. A secondary pedestrian entrance is accessible from Elm Street on the south end of the site, for the commercial units and to access the indoor amenity and community hub uses. Pedestrian access to the community hub at the rear will be provided adjacent to Balsam Lane. These at-grade accesses will also provide a connection to the municipally owned commercial parking lot located at Balsam Lane via the pedestrian walkway located at the north end of the site.

2.1.2 Vehicle Access

The proposed development plan proposes that all vehicular site access is from Mountain Street, at the northwest corner of the site. The existing driveway off of Mountain Street, which will generally remain unchanged.

2.2 Vehicular Parking

A three-level parking garage located above- and below-grade, provides a total of 150 parking spaces, accessed via the northwest corner of the site to/from Mountain Street.

The first level (P1) of the parking garage is located below-grade and is shared between non-residential (including commercial and visitor) parking and resident parking, containing a total of 72 parking spaces (27 commercial spaces, 2 car-share spaces and 43 resident spaces). Additionally, 6 tandem parking spaces for residents are provided on the P1 level of the parking garage. The second and third levels (Ground Floor and Intermediate Floor) of the parking garage are located above grade and are for residential parking, providing a supply of 40 and 38 parking spaces, respectively.

Three (3) surface parking spots in the adjacent municipal parking off of Balsam Lane are also owned by Owners of 13 Mountain Street, 19 Elm Street and 21 Elm Street.

2.3 Bicycle Facilities

The development proposal includes 56 bicycle parking spaces. Of these spaces, 54 spaces are for residential uses and 2 spaces are for non-residential uses.

The 56 bicycle parking spaces designated for residential tenant and visitor uses are located on the ground level, in a secure bike room close to the main residential entrance. Bicycle amenities, such as a bike repair station and wash station, will also be included on-site and further detailed during SPA.

2.4 Loading and Servicing

An at-grade loading area at the north side of the site includes one (1) loading space and meets the requirements outlined in the Town of Grimsby Zoning By-law 14-45.



3.0 PLANNING AND POLICY CONTEXT

The Site is located within the Downtown District area of Grimsby, where a number of provincial, regional and local planning policies and discussions have been developed over time that directly affect the site. The following provides a summary of the key existing and emerging planning policy applicable to the site that support housing intensification, mitigate vehicular traffic, reduce single-occupant vehicle trips, and encourage more sustainable travel within the site area.

3.1 Provincial and Regional Policies

3.1.1 Provincial Planning Statement

The Provincial Planning Statement, released in 2024, provides a set of adapted and integrated land use planning policies to form a new provincial planning policy tool and replace the former 2020 Provincial Policy Statement and Growth Plan for the Greater Golden Horseshoe. The current Provincial Planning Statement came in effect on October 20, 2024.

The 2024 PPS provides the latest provincial direction towards planning in the Province of Ontario and guides municipal planning and policy creation.

The Provincial Planning Statement aims to further leverage several policies to provide a streamlined land use planning policy framework. In particular, the Provincial Planning Statement builds upon housing-supportive policies from both former documents to provide municipalities with additional tools and flexibility to build more homes. The proposed changes to policies are related to 5 priority areas:

1. Generating an appropriate housing supply;
2. Making land available for development;
3. Providing infrastructure to support development;
4. Balancing housing with resources; and
5. Implementation.

Chapter 2 (Building Homes, Sustaining Strong and Competitive Communities) and Chapter 3 (Infrastructure and Facilities) of the Provincial Planning Statement contain transportation-related policies most relevant to this application. Chapter 2 contains policies related emphasizing the need for diverse housing options to support strong and competitive communities. It highlights policies that promote mixed housing types and encourage intensification, aiming to meet the growing demand for housing across various regions. These strategies are designed to accommodate population growth and enhance community development, reduce greenhouse gas emissions, and promote active transportation (i.e. cycling, walking, micro-mobility).

Chapter 3 contains several policies related to providing safe, energy efficient transportation systems that can appropriately address projected needs. Policies therein include those related to promoting healthy and active communities through facilitating active transportation, planning public streets to meet the needs of all ages and abilities, providing opportunities for convenient public access to recreational areas, and making efficient use of existing and planning infrastructure through TDM strategies.

3.1.2 Bill 185: Cutting Red Tape to Build More Homes Act, 2024

Originally detailed in the 2020 Growth Plan for the Greater Golden Horseshoe (Growth Plan), the Province of Ontario encourages transit-supportive policies, such as reduced parking standards, within major transit station areas (MTSAs), which are areas that are within an approximate 10-minute walk of an existing or planned higher order transit station. This



policy was carried forward in the aforementioned 2024 PPS, which took the place of the Growth Plan. Further, in 2024, the Province of Ontario government introduced “Bill 185: Cutting Red Tape to Build More Homes Act, 2024”. This provincial Bill introduced a number of changes to Province of Ontario Acts, including the Planning Act. Included among these changes were changes to prohibit and/or limit the ability for Municipal Official Plans and Zoning By-law’s to require that an owner provide parking facilities (other than for bicycle parking) in Protected Major Transit Station Areas and areas around transit stations. Further, it repealed portions of any existing Official Plans and Zoning By-law’s which included minimum parking requirements.

The Site is not located within an MTSA and therefore, this policy is not applicable to the subject site. However, these recent policy changes are indicative of policy trends that generally de-emphasize minimum parking requirements for development that produces housing, especially for development sites located in close proximity to public transit service. The Site’s proximity and ability to access transit is outlined in **Section 4.2**.

3.1.3 Niagara Region Official Plan

The 2022 Niagara Official Plan (Niagara OP), adopted by Niagara Region Council in June 2022 and approved by the Province in November 2022, outlines the region’s strategic policy planning framework for managing growth within Niagara Region. Chapter 2 (Growing Region) and Chapter 3 (Sustainable Region) of the Niagara OP highlight key policies related to the development including intensification and sustainability measures.

Chapter 2 outlines policies to promote higher-density urban development, fostering a diverse mix of land uses and housing types. This approach supports housing affordability and intensification. By focusing growth within urban areas at densities that align with existing and planned public transit, the OP encourages the development of transit-supportive communities while addressing the region's affordable housing needs.

Chapter 3 outlines policies and objectives to mitigate climate change and prioritizing net-zero community development. This includes incorporating active transportation and transportation demand management (TDM) measures to reduce single-occupancy vehicle (SOV) trips.

3.1.4 Niagara Region Transportation Master Plan

The Niagara Region Transportation Master Plan (Niagara Region TMP) was approved by Regional Council in July 2017 and updated to reflect comments received in October 2017. The Niagara Region TMP provides a long-term strategy for transportation into 2041 and is intended to inform the development of transportation policies in the Region’s next Official Plan.

Key transportation related policies outlined in the Niagara Region TMP include improving options for sustainable modes of transportation, reducing greenhouse gas emissions, promote active transportation options and implement Transportation Demand Management (TDM) initiatives.



3.2 Local Policies

3.2.1 Town of Grimsby Official Plan

The Town of Grimsby Official Plan (Grimsby OP), adopted by the Town Council in 2009 and recently consolidated in January 2025, provides guidance for growth and development within the Town until 2031. The Grimsby OP implements provincial-level guidance, consistent with the Provincial Policy Statement and it also implements policies outlined in the Niagara OP.

The Grimsby OP outlines the municipality's progressive intention to develop Grimsby as a complete community and reduce out-commuting by providing appropriate mixed-use opportunities to meet long-term needs of residents.

According to the Official Plan, the site is located within the Downtown Intensification area of the Downtown District. It is the intent of the Town that the Downtown-Intensification designation provides opportunities for large scale commercial development, mixed use developments and significant residential intensification.

3.2.2 Town of Grimsby Transportation Master Plan

In June 2024, the Town of Grimsby announced the commencement of the development of a Town-wide Transportation Master Plan (Grimsby TMP). The purpose of the Grimsby TMP is to strategically guide the planning, design and implementation of multimodal transportation infrastructure, maintenance, operations, policies, and programming over the next 20 years. The development of the Grimsby TMP is still ongoing and a draft is anticipated to be completed by Spring 2025.



4.0 AREA TRANSPORTATION CONTEXT

4.1 Area Street

The existing area road network is described in **Table 2** and illustrated on **Figure 3**. The existing area road network lane configuration and intersection control measures are illustrated on **Figure 4**.

Table 2 Summary of Area Street Network

	Name	Orientation	Extent of Street	Number of Lanes	Speed Limit	Future Changes
Regional Roads	Mountain Street – Christie Street ¹ (Regional Road 12)	North – South	North Limit: Main St. E. & continues as Christie St. South Limit: Mud St. & continues as Grimsby Rd.	2 lanes (one lane in each direction) with centre left turn lanes at the key intersections	50 km/h	Road widening is proposed adjacent to the site. Plans unknown at this time for any future road work.
	Main St. E. ² (Regional Road 81)	East – West	East Limit: Chardonay Pl. & continues as King St. West Limit: Main St. W. & continues as Livingston Ave.	4 lane cross section (two lanes in each direction) with one lane used per direction for on-street parking	50 km/h	As part of Downtown Reimagined plan, Main Street reconstruction is planned between Mountain Street and east of Elm Street, to widen sidewalks and reduce asphalt lane widths to promote pedestrian movement.
	Main St. W. ¹ (Regional Road 81)	Mostly East – West With a small North – South portion of the road between Main Street East & Elm St.	North Limit: Main St. E. West Limit: Lampman Dr.	2 lanes (one lane in each direction)	50 km/h	No Changes
	South Service Road – Clarke Street (Regional Road 40)	East – West	East Limit: Twenty-First Street, Jordan Harbour West Limit: Centennial Parkway North, Hamilton	2 lanes (one lane in each direction)	50-60 km/h	No Changes
Local Roads	Elm Street ¹	East – West	East Limit: Main St. E. West Limit: Gibson St. & continues as Main St. W.	2 lanes (one lane in each direction) with centre left turn lanes at the key intersections	50 km/h	No Changes
	Balsam Lane ¹ Private Lane	Curved Road	North Limit: Mountain St. South Limit: Elm St.	2 lanes (one lane in each direction)	40 km/h	No Changes

Notes:

1. No parking is permitted anytime.
2. Parking is permitted: 1 hr parking permitted Saturday to Wednesday 8 AM to 6PM & Thursday to Friday 8 AM to 9PM.





FIGURE 3 EXISTING STREET NETWORK

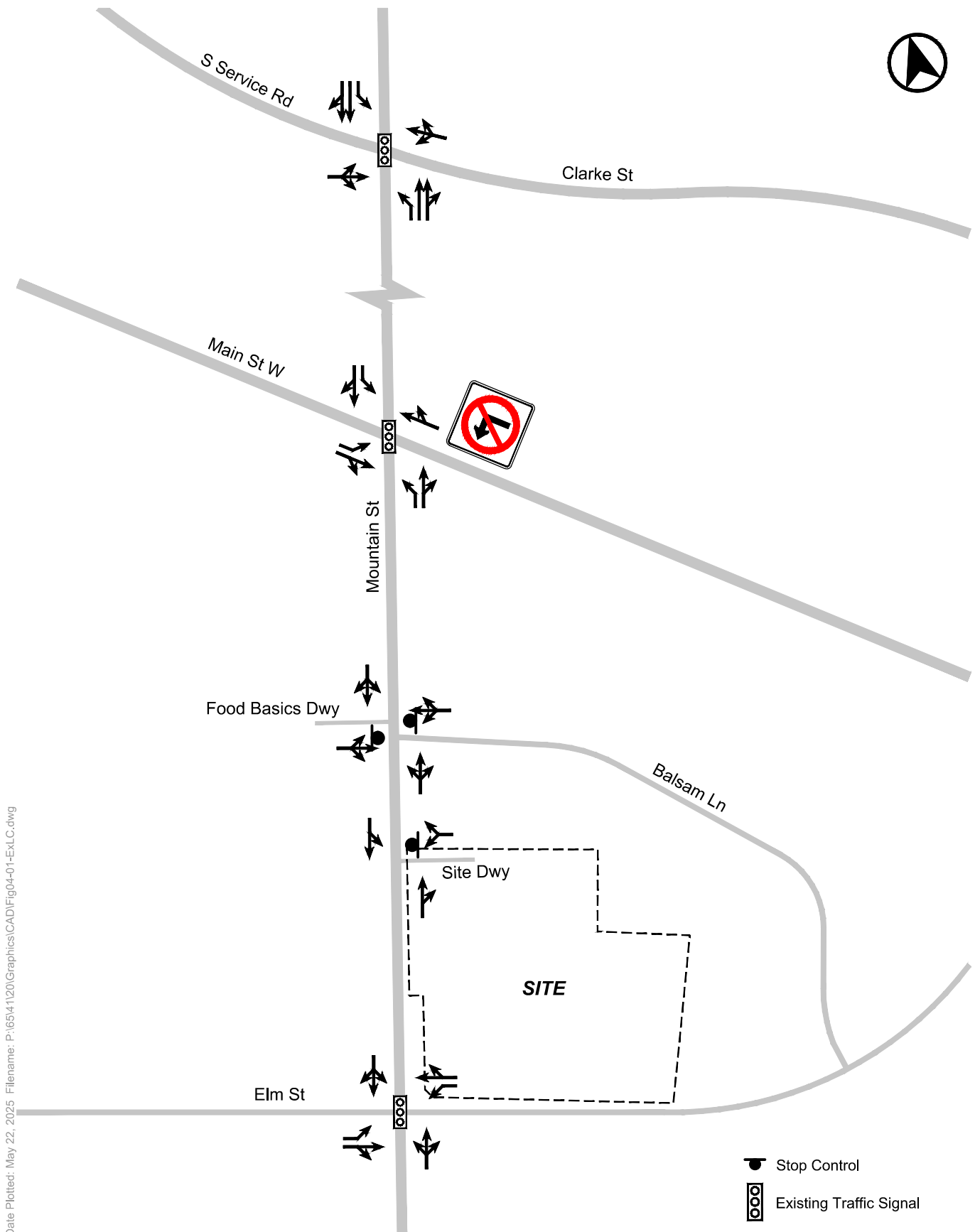


FIGURE 4 EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

4.2 Area Transit Network

4.2.1 National Transit Facilities

The Grimsby VIA Rail Station is located approximately 700-metres north of the site, accessible within an estimated 10-minute walk, 2-minute drive, or 3-minute cycle. The station is on the Toronto – Niagara Falls – New York Line. This train service accesses this station twice a day (once in the morning and in the afternoon) and provides access to both Toronto and Niagara Falls.

4.2.2 Regional Transit Facilities

Regional transit facilities in the vicinity of the site are serviced from the Grimsby GO Bus Stop at the intersection of Casablanca Boulevard / Queen Elizabeth Parkway (QEW). This stop is serviced by the 12 bus (Niagara Falls to Toronto). This bus service runs all day in both directions during the weekdays and weekends having a one hour headway. This stop is located 3.4 kilometres (or a 5 minute drive) from the site.

As part of the Niagara Falls Rail Service Extension plan proposed by Metrolinx a new Grimsby GO Transit Station is being proposed as part of these transit extension plans. The new Grimsby GO Transit Station will be located where the existing Grimsby GO Bus Stop is located 3.4 km from the site. This station is part of four new Stations that are being proposed and would expand the Lakeshore West Rail line which would allow for continuous two-way rail service to Niagara Falls and Toronto.

4.2.3 Local Transit Facilities

The Niagara Region Transit announced on August 17th, 2020 that they have launched a transit solution that is affordable, efficient and accessible for the Town of Grimsby. The “NRT On Demand” transit solution is a ride-share service that allows for residents to schedule a trip within the Town of Grimsby and the Niagara Region. Regular transit fares apply, and trips can be pre-booked up to 7 days in advance. These services can also be used to provide local transit connections to existing and future GO Transit facilities.

The existing area transit context is illustrated in **Figure 5**.

4.2.4 Planned Transit Improvements

4.2.4.1 GRIMSBY GO TRANSIT STATION

As part of the Niagara Falls Rail Service Extension plan proposed by Metrolinx, a new Grimsby GO Transit Station is being proposed at Casablanca Blvd and South Service Road. On January 28, 2025, the Transportation Minister of Ontario announced that the province is moving ahead with the proposed Grimsby GO Rail Station, and a contract will be awarded in Spring 2025.

This station is part of four new GO Stations that are being proposed and would expand the Lakeshore West Rail line, allowing for continuous two-way rail service to Niagara Falls and Toronto, making stops in municipalities in between, including Hamilton, Burlington and Mississauga. The Site is located 3.4 kilometres (or a 5-minute drive) from the proposed Grimsby GO Transit Station.

4.2.4.2 PRIVATE TRANSIT OFFERING

A purpose-built rental transit program is being proposed, marketed as the “last mile downtown shuttle”. The shuttle service proposes a 16 to 24 passenger vehicle which would provide convenient access to key transit locations. Example the proposed shuttle passenger vehicle is illustrated in **Exhibit 1**.



This is being supported by a group of developers that may potentially sign-on to extend the service to include their developments in the Town, including the applicant, DeSantis Homes, Losani Homes, Harbour Hills and Innovo Matrix.

The proposed shuttle service proposes two conceptual routes: Route A, servicing West Lincoln Memorial Hospital, and Route B, servicing the Grimsby GO Station located at Casablanca Blvd. at QEW Park & Ride/Costco. The service is proposed to operate daily from 9:00 AM to 5:00 PM, with a 60-minute headway schedule.

Finalized shuttle operation times and destinations to be provided closer to the development delivery.

The conceptual shuttle proposal plan is provided in **Appendix B**.



Exhibit 1 Last Mile Downtown Shuttle – Proposed Shuttle Vehicle



4.3 Area Pedestrian & Cycling Network

Pedestrian sidewalks exist on all streets in the vicinity of the site, while some informal cycling facilities exist along portions of Main Street to the east and west of the site, and along Mountain Street to the south of the site. In addition, there are a number of multi-use path routes in the vicinity of the site, which provides an east – west connection between the Hamilton and Niagara Region. These routes include:

Bruce Trail

A portion of the Bruce Trail passes through the Town of Grimsby. The closest entrance to the site is within Beamer Memorial Conservation area, approximately 300 metres south of the site along Mountain Street.

The Bruce Trail is a hiking trail in the southern Ontario that runs along the Niagara Escarpment from Niagara to Tobermory. The main trail is comprised of approximately 910 km of length, in addition there are more than 400 km of side trails. This trail system is among the longest and oldest marked hiking trails in Canada.

Forty Mile Creek Side Trail

This trail is a walking trail through downtown Grimsby is composed of approximately 1.7 km of trail length that connects to both the Bruce Trail and the Waterfront Trail. Access to this trail is located to the west of the site off of Elm Street and is within a 1 minute bicycle ride or 2 minute walk from the site.

Great Lakes Waterfront Trail

The Great Lakes Waterfront trail is a cycling trail that is over 3,600 km in length and is comprised of both on-road and off-road facilities. This trail extends along the waterfront from the Ontario / Quebec border in the east and extends to Sault St. Marie in the west.

In the vicinity of the site, entrance to the trail is at Olive Street / Elizabeth Street, 1.2 km away from the site or a 6 minute bicycle ride.

Greenbelt Cycle Route

The greenbelt cycling route includes 475 km of signed routings across Southern Ontario from Niagara to Northumberland. In vicinity of the site the bicycle route is along Ridge Road East and can be accessed off of Mountain Road which is 4-minute bicycle ride from the site.

The existing cycling routes and walking trails are illustrated **Figure 5**.



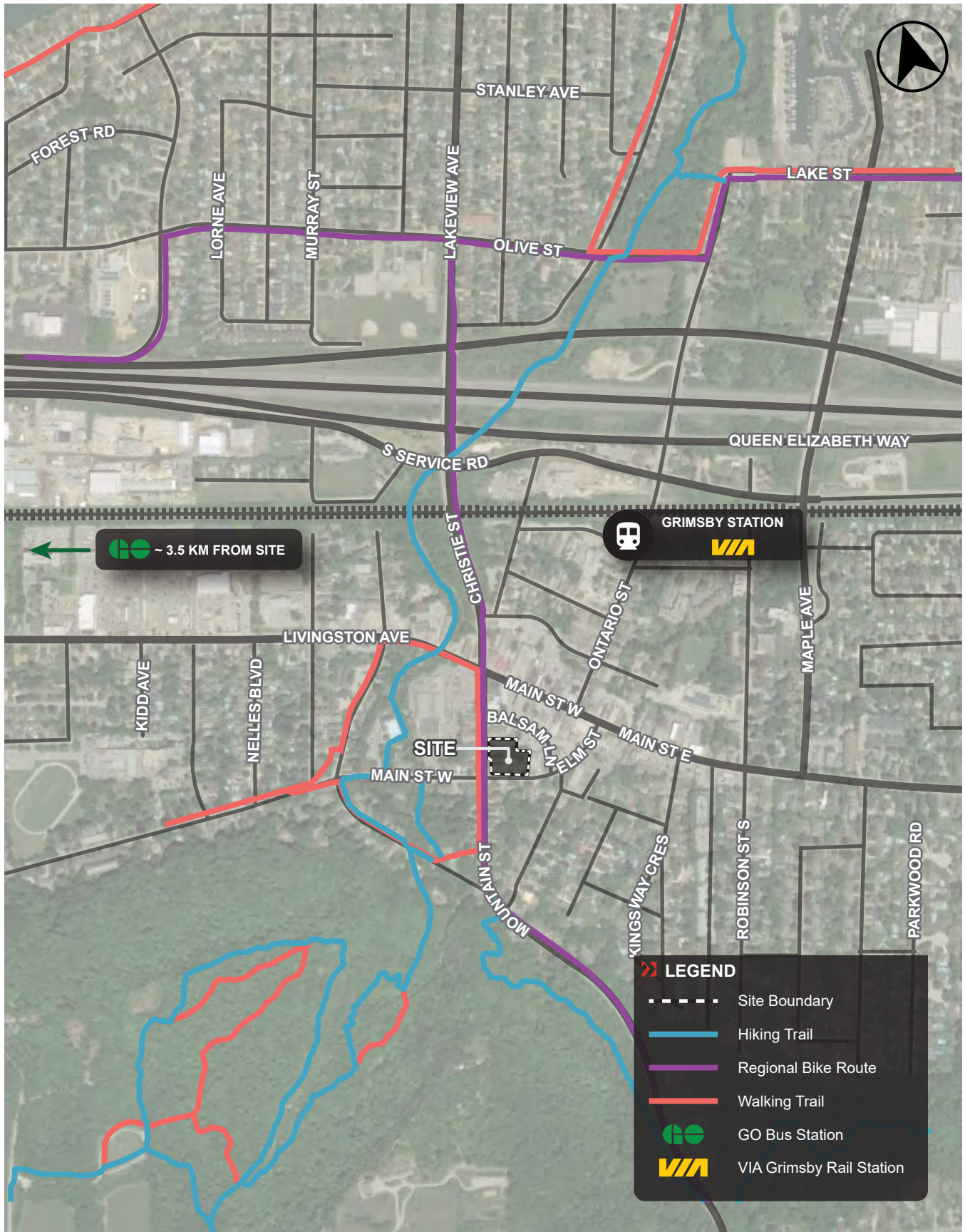


FIGURE 5 EXISTING TRANSIT, PEDESTRIAN & CYCLING NETWORK

5.0 TRANSPORTATION DEMAND MANAGEMENT

A comprehensive Transportation Demand Management (TDM) Plan proposed for the site has been conceptualized to leverage the area transportation context in order to reduce vehicular trips made to and from the site. The intent is also to reduce vehicular parking demand while providing alternative travel options for residents and visitors that do not require vehicle ownership. It is our opinion that the proposed TDM Plan is an important supporting element to the proposed (reduced) residential parking supply.

The proposed development will be providing the following Transportation Demand Management (TDM) measures:

5.1 Residential TDM

- **Reduced Vehicular Parking Supply:** The reduction of parking supply (compared to the applicable requirements) is itself a TDM measure as it will force residents/visitors to consider alternative travel modes
- **Unbundled Parking:** Parking will be offered to prospective residents independently from the rental of residential units, encouraging residents to reconsider the use or ownership of a vehicle, as there will be an additional cost to rent parking.
- **Visible Transit Information:** The lobby of the building should have access to local and regional transit information to assist residents in taking transit.
- **Bicycle Parking:** The proposed development will provide 54 dedicated resident bicycle spaces (0.31 per unit). Tenant lockers are also provided above and beyond the provision of long-term bike storage set out in the Town By-law 14-45.
- **Community Marketing Outreach:** An event will be held around the time of building launch focused on disseminating information about sustainable travel options (i.e. Travel Mode Information Packages, rideshare programs information, etc.).
- **Enhanced Pedestrian Facilities:** the provision of continuous walkways, including a plaza area, and outdoor amenity area, will improve walkability within and to/from the site.
- **NRT On Demand Transportation Passes:** The proposed development is committed to offer NRT (Niagara Regional Transit) On Demand transportation passes to all tenants for the first year of the rental building's operation.
- **Car Share Program:** Consideration to provide dedicated car share parking space(s) within the development for an on-site car share vehicle and promote the use by residents. As no car share program currently operates in the Town of Grimsby or Niagara Region, the program would be implemented and operated directly by the building's owner or applicant. There are 2 car share spaces currently contemplated as part of the development proposal.
- **Site Shuttle:** Consideration to provide a private shuttle bus service for residents which would be operated by the building. The objective of this measure is to "reduce" the perceived and effective distance between the site and key transit locations such as the existing VIA Rail Station, Grimsby GO Bus Stop, or the future planned Grimsby GO Station. The marketed "last mile shuttle" would operate on a regular basis seven days a week, and the shuttle service could be expanded to connect the site to other destinations. Shuttle operation times and destinations to be provided closer to the development delivery. Further details are provided in **Section 4.2.4.2.**



5.2 Non-Residential TDM

- **Shared Parking Provisions:** Permits the efficient sharing between land-uses and reduce the total number of parking spaces required for residential visitors.
- **Bicycle Parking:** The proposed development will provide 56 total bicycle spaces consisting of 2 short-term bicycle parking spaces in highly visible locations in close proximity to the entrance for visitors.
- **Visible Transit Information:** The lobby of the building should have access to local and regional transit information to assist visitors in taking transit.
- **Visible Parking Information:** The lobby of the building should have access to local information to assist guests in identifying options for parking in the area.
- **Enhanced Pedestrian Facilities:** the provision of continuous walkways, including a central plaza, and outdoor amenity area, will improve walkability within and to/from the site



6.0 VEHICULAR PARKING

BA Group has undertaken a review of the vehicular parking aspects of the proposed development recognizing the area context and readily available alternative transportation options. The following sections outlines the applicable parking requirements to the proposed development as well as provides a summary discussion of the proposed parking supply.

6.1 Zoning By-Law Requirements

The site is currently subject to multiple Zoning By-law parking requirements, the following sections outline the parking requirements of the applicable Zoning By-laws.

Site Specific Zoning By-law (OLT 24-001)

13 Mountain Street and 19-21 Elm Street is currently subject to the Site-Specific requirements of Town of Grimsby Zoning By-law 14-45 Exception 377 (OLT 24-001) permitted by the Ontario Land Tribunal (OLT) in February 2024. The inclusion of the 23 Elm Street property to the site occurred after the passing of this Site-Specific Zoning By-law and is not applicable to the 23 Elm Street property.

The minimum parking supply standards of the Site-Specific Zoning By-law have been applied to the entire site and is summarized in **Table 3**. Application of these standards would require a total of 232 parking spaces including 177 residential spaces, 45 residential visitor spaces and 10 retail spaces.

Table 3 Site Specific Parking Requirements (OLT 24-001)

Building Use	Units/GFA	Minimum Parking Rate	Minimum Required Parking Spaces
Residential Tenant			
Residential Dwelling Unit	177 units	1.0 spaces / units	177 spaces
Residential Sub-Total			177 spaces
Non-Residential			
Residential Visitor	177 units	0.25 spaces / unit	45 spaces
Retail Uses	279 m ²	1.0 spaces / 28 m ² GFA	10 spaces
Non-Residential Sub-Total			55 spaces
Total Parking Requirements			232 spaces
Exception 115 of Zoning By-law 14-45 ³			-2 spaces
21 Elm Street Parking Certificate ⁴			-1 spaces
Cash-in-lieu ⁵			-15 spaces
Total Residential Parking Requirements with Cash-in-Lieu			214 spaces

Notes:

1. Site statistics are based upon site plans prepared by Studio JCI, dated May 16th, 2025.
2. Vehicular parking calculations resulting in a fraction have been rounded up to the nearest whole number in accordance with the requirements outlined in Section 5.2 of the Town of Grimsby Zoning By-law 14-45.
3. Town of Grimsby Zoning By-law 14-45 Exception 115 (By-law # 95-105) allows the reduction of 2 parking spaces where a road widening has been dedicated for 19 Elm Street.
4. A parking certificate has been obtained for 21 Elm Street permitting payment-in-lieu of one parking space. This payment has been made and the certificate enacted (File No: 5007-221).
5. Town of Grimsby Zoning By-law 14-45 Exception 377 (OLT-22-003541) permits the use of cash-in-lieu for up to a maximum of 15 spaces for any deficiency from the parking requirement.



Exception 115 of Zoning By-law 14-45 allows the reduction of 2 parking spaces, 21 Elm Street's acquired parking certificate allows the reduction of 1 parking space, and Exception 337 of Zoning By-law 14-45 (OLT 24-001) permits the use of cash-in-lieu for up to a maximum of 15 spaces. Application of these Site-Specific exceptions results in a total required parking supply of 214 parking spaces.

Town of Grimsby Zoning By-law 14-45

23 Elm Street is currently subject the Town of Grimsby Zoning By-law 14-45 parking requirements.

The minimum parking supply standards of Zoning By-law 14-45 have been applied to the entire site and is summarized in **Table 4**. Application of these standards would require a total of 277 parking spaces including 222 residential spaces, 45 residential visitor spaces and 10 retail spaces.

Exception 115 of Zoning By-law 14-45 allows the reduction of 2 parking spaces, and 21 Elm Street's acquired parking certificate allows the reduction of 1 parking space. Application of these exceptions results in a total required parking supply of 274 parking spaces.

Table 4 Zoning By-law 14-45

Building Use	Units/GFA	Minimum Parking Rate	Minimum Required Parking Spaces
Residential Tenant			
Residential Dwelling Unit	177 units	1.25 spaces / units	222 spaces
Residential Sub-Total			222 spaces
Non-Residential			
Residential Visitor	177 units	0.25 spaces / unit	45 spaces
Retail Uses	279 m ²	1.0 spaces / 28 m ² GFA	10 spaces
Non-Residential Sub-Total			55 spaces
Total Residential Parking Requirements			277 spaces
Exception 115 of Zoning By-law 14-45 ³			-2 spaces
21 Elm Street Parking Certificate ⁴			-1 spaces
Total Residential Parking Requirements with Cash-in-Lieu			274 spaces

Notes:

1. Site statistics are based upon site plans prepared by Studio JCI, dated May 16th, 2025.
2. Vehicular parking calculations resulting in a fraction have been rounded up to the nearest whole number in accordance with the requirements outlined in Section 5.2 of the Town of Grimsby Zoning By-law 14-45.
3. Town of Grimsby Zoning By-law 14-45 Exception 115 (By-law # 95-105) allows the reduction of 2 parking spaces where a road widening has been dedicated for 19 Elm Street.
4. A parking certificate has been obtained for 21 Elm Street permitting payment-in-lieu of one parking space. This payment has been made and the certificate enacted (File No: 5007-221).



6.1.1 Accessible Parking Requirements

Town of Grimsby Zoning By-law 24-75 requires accessible parking to be provided at the following minimum rates:

- Supply of 1 – 12 spaces: 1 Type A space;
- Supply of 13 – 100 spaces: 4% of the supply;
- Supply of 101 – 200 spaces: 3% of the supply + 1 space;
- Supply of 201 – 1,000 spaces: 2% of the supply + 2 spaces; and
- Supply of 1,001+ spaces: 1% of the supply + 11 spaces.

The Zoning By-law states that for lots with an even number of total accessible parking spaces, an equal number of Type 'A' and Type 'B' spaces must be provided. Where the minimum number of accessible parking spaces is odd, an equal number of Type 'A' and Type 'B' accessible parking spaces shall be provided but the last accessible parking space may be a Type B. The two types of spaces must adhere to the following width dimensions:

- Type A space: 3.4 metres (width)
- Type B space: 2.4 metres (width)

Both types must include a 1.5-metre (width) access aisle adjacent to the accessible space, which extends the full length of the parking space.

Application of Zoning By-law 24-75 to the site results in a total minimum accessible parking requirement of 7 accessible spaces under the Site-Specific minimum parking requirement of 214 spaces, or 8 accessible spaces under the Zoning By-law 14-45 minimum parking requirement of 274 spaces.



6.2 Proposed Vehicular Parking Supply

The proposed parking supply includes a total of 168 parking spaces including **150 on-site parking spaces** provided within a 3-level parking garage and 18 off-site spaces. The proposed breakdown of parking is as follows:

• Residential Parking	121 spaces (excluding 6 tandem parking spaces)
• Commercial Parking	45 spaces (including 27 on-site spaces, and 18 off-site spaces)
• Car-Share	2 spaces
• Total Provided On-Site	150 parking spaces

The first level (P1) of the parking garage, located below-grade and is shared between commercial parking and resident parking, containing a total of 72 parking spaces. The second and third levels (Ground Floor and Intermediate Floor) of the parking garage are located above grade and are for residential parking, providing a supply of 40 and 38 parking spaces, respectively.

The on-site provided parking supply of 150 parking spaces, includes the provision of 121 residential spaces, 2 car-share spaces, and 27 commercial spaces to be shared on a non-exclusive basis between residential visitors and retail uses.

To allow for operation under single ownership, the non-residential parking spaces (including visitor and retail) will be classified as “commercial” and managed as a commercial (paid parking) garage, located on the P1 level of the proposed parking garage. Residential parking will be offered to prospective residents independently from the rental of residential units.

The proposed parking supply of 168 parking spaces, including 150 on-site and 18 off-site parking spaces, does not meet either the Site Specific Zoning By-law OLT 24-001 or Zoning By-law 14-45 by some margin.

Sections 6.3, 6.4 and 6.5 provides a review of the appropriateness of a reduced residential and non-residential parking supply. **Section 6.6** outlines the proposed vehicular parking rates.

6.2.1 Accessible Parking Supply

Since a reduced parking requirement is being sought for the site, the requirements for the accessible parking supply have been determined by the proposed parking supply (150 spaces) for the site.

Application of Zoning By-law 24-75 to the site results in a total minimum accessible parking requirement of 6 spaces. The current proposal incorporates 6 accessible parking spaces, including 3 Type A and 3 Type B spaces, meeting the requirement of the Zoning By-law 24-75. These spaces are located in close proximity to the elevator core, allowing convenient pedestrian access to and from the space.



6.3 Review of Planning Policies

As growth in cities increase, transit connections and access to alternative modes of transportation (e.g., walking, cycling, car-share, carpooling) become more critical in moving residents, visitors, and employees between home, work, and entertainment destinations. In addition, developments within major cities in North America are continuously recognizing that the location of a proposed development, in relation to transit services, pedestrian infrastructure, and cycling infrastructure plays an important role in decreasing auto ownership, and potentially alleviating traffic congestion.

In this way, increasing efforts and investments are being made to change travel behaviour, as shown through existing and evolving provincial, regional, and local policies as it pertains to parking management, parking requirements, and prioritizing more sustainable travel choices over automobiles.

The following sections provide further insight to the planning policies previously outlined in **Section 3.0** and their support in a reduced parking supply.

6.3.1 Provincial and Regional Policies

Provincial Planning Statement

The Provincial Planning Statement (PPS), which came into effect on October 20, 2024, provides policy directions to promote transportation demand management (TDM) strategies to be implemented to increase the efficiency of existing and planned transportation infrastructure (**Section 4.2**). Further, the PPS promotes new housing with densities which efficiently use land, resources, infrastructure and public service facilities, and support the use of active transportation and require transit-supportive development and prioritizing intensification in proximity to transit.

As outlined previously in **Section 3.0**, the PPS outlines policies emphasizing the need for diverse housing options to support competitive communities and policies that promote mixed housing types, encouraging intensification across various regions.

Bill 185: Cutting Red Tap to Build More Homes Act

Bill 185 included changes to prohibit and/or limit the ability for Municipal Official Plans and Zoning By-laws to require that an owner provide parking facilities (other than for bicycle parking) in Protected Major Transit Station Areas and areas around transit stations. Further, it repealed portions of any existing Official Plans and Zoning By-laws which included minimum parking requirements.

The Site is not located within an MTSA and therefore, this policy is not applicable to the subject site. However, these recent policy changes are indicative of policy trends that generally de-emphasize minimum parking requirements for development that produces housing, especially for development sites located in close proximity to public transit service. As outlined further in **Section 4.2**, the site is located within an area which is transit accessible through Niagara Region Transit's OnDemand Transit, "NRT On Demand", transit service. Additionally, as part of Metrolinx's GO Rail service expansion, a new Grimsby GO Transit Station is proposed. The site is located 3.4 kilometres (or a 5-minute drive) from the proposed Grimsby GO Transit Station and will be easily accessible through the development's on-site Shuttle Service.

Therefore, the proposed parking supply is reflective of ongoing policy trends towards de-emphasizing minimum parking requirements.

Niagara Region Official Plan

The Niagara Region OP states that the Region will develop transit-supportive development standards in Local Area Municipalities, to guide development on sites adjacent to or near existing or planned public transit. It further notes that, within protected MTSAs, development will be supported by "providing alternative development standards, such as reduced parking standards." As noted, the subject site is not located within an MTSA although it is located within an area which is transit accessible. This policy is reflective of ongoing policy trends towards de-emphasizing minimum parking requirements. Given that the proposed parking supply for the development is less than one parking space per unit for residential uses,



there will be residents and visitors of the building which will not own or use a private automobile and therefore, will utilize active transportation and public transit to complete trips.

The proposed development includes the provision of affordable housing units, which will be operated by the Grimsby Benevolent Fund (GBF). See **Appendix J** for a letter from GBF stating their support for the development, and that many of their residents rely on taxi and/or NRT service as their means of transportation. As such, the proposed parking supply is consistent with this policy in the Regional OP.

Niagara Region Transportation Master Plan

The Niagara Region Transportation Master Plan (Niagara Region TMP) includes Transportation Demand Management (TDM) policies which are described in the Niagara Region TMP as “a set of policies, programs, services, and initiatives that aim to increase efficiency in the transportation network by changing how, how much, when, where, and why people travel.” It is stated that the Region is to proactively boost demand for public transit and active transportation.

As it relates to the subject site, the Niagara Region TMP details how TDM aims to influence travel and one of the noted strategies is:

- *Providing regulations aimed at limiting single-occupant car trips (e.g., parking regulations, land use policies, congestion pricing)*

Further, a recommended action is to initiate a Travel Demand Management study which addresses, among other matters:

- *Collaborating with local area municipalities to apply guidelines that maximize the TDM supportiveness of new developments across Niagara Region, including parking strategies.*

The proposed reduced parking supply is consistent with the policy goals stated in the Niagara Region TMP given that it will inherently limit single-occupant car trips and as such, maximize the TDM supportiveness of a new development within the Region.

6.3.2 Local Policies

Town of Grimsby Official Plan

The Town of Grimsby Official Plan, last consolidated in January 2025, outlines the Municipality’s progressive intention to develop Grimsby as a complete community and reduce out-commuting by providing appropriate mixed-use opportunities to meet long-term needs of residents. This is a contributing factor to the ability of residents to live, work, and play without the need for a personal vehicle.

According to the Official Plan, the site is located within the Downtown Intensification area of the Downtown District. Some key strategies and intentions for redevelopment within the downtown include the following:

- Support small town atmosphere and maintain the Downtown’s cultural heritage;
- Creating a built environment that provides sensitive integration of new with existing development;
- Creating a vibrant and active street environment;
- The Town may offer development incentives like, reduced parking standards to facilitate intensification;
- Provide public parking lots to expand the supply of parking and promote on-street parking; and,
- Consider reduction of parking requirements for redevelopment proposals in proximity to public parking facilities.

Based on the planned policies and strategies the Town has outlined in their Official Plan, and the existing vehicle travel characteristics, it is expected to see a downward trend in vehicle ownership in the downtown area as a result of the intensification and diverse environment.



6.3.3 Other Municipal Policies Supportive of a Reduced Parking Supply

Other Municipal Parking Standards

Other municipalities within Ontario have supported reduced parking ratios for resident parking within their downtown context. **Table 8** provides a summary of comparable residential parking ratios at Municipalities within the GTHA and beyond, of which have a similar area context as the proposed development and demonstrate reduced ratios for resident parking.

These comparable residential parking standards within other Municipalities range between having no minimum parking standards to a parking standard of 1.0 space per unit in a downtown context area. The cities of Brampton, Hamilton, Vaughan and Pickering adopt a rate less than 1.0 space per unit and the City's of St. Catherine's and Kitchener have no minimum residential parking requirement for downtown context areas. Additionally, the city of St. Catherine requires no residential parking for affordable units and the Town of Collingwood requires only 0.5 spaces per unit for rental apartment units.

The Town of Grimsby's residential parking rate of 1.25 spaces per unit is considered to be conservatively high, particularly for a downtown site, therefore, adopting a reduced residential parking supply rate is reasonable based on the parking standard trends that are observed in other comparable Municipalities.

Table 5 Summary of Comparable Zoning By-law Standards

Municipality	Resident Parking Rates			Zoning By-law (Applicable Area or Unit Type)
City of Brampton	0.5 spaces / unit			By-law 270-2004 (Central Area / Downtown)
City of Burlington	1.0 spaces / unit			By-law 2020 (Downtown)
City of Hamilton	Units < 50 m²	1 m² to 12 m² 13 m² +	0.0 sps / unit 0.3 sps / unit	By-law 05-200 (Transit Oriented Corridor Zone)
	Units > 50 m²	1 m² to 12 m² 13 m² to 50 m² 51 m² +	0.0 sps / unit 0.5 sps / unit 0.7 sps / unit	
	Blended		0.7 sps / unit	
City of Kitchener	No Minimum			By-law 2019-051 (Urban Growth Ctr. / Downtown)
City of Mississauga	1.0 spaces / unit			By-law 0225-2007 (City Centre)
	0.7 spaces / unit			By-law 0225-2007 (Non-Profit Rental Apartment)
City of Pickering	0.8 spaces / unit			By-law 7553-17 (City Centre)
City of St. Catherines	Downtown Apartment		No Minimum	By-law 2013-283 (Downtown)
	Affordable Units		No Minimum	By-law 2025-003 (Affordable Housing)
Town of Collingwood	0.50 spaces / unit			By-law 2024-053 (Apartment Dwellings)
Town of Niagara on the Lake	1.0 spaces / unit			By-law 4316-09
City of Vaughan	Studio 1 – Bed 2 – Bed 3 - Bed		1.0 sps / unit 0.7 sps / unit 0.9 sps / unit 1.0 sps / unit	By-law 1-88 (Vaughan Metropolitan Centre)
	Blended		0.9 sps / unit	



Car Share Policies

Car sharing, is a service that provides users with short-term access to vehicles and has been shown to offer a variety of benefits for urban transportation systems, the environment, and residents. These benefits include:

- reduced vehicle ownership rates;
- reduced household transportation costs;
- reduced vehicle kilometres travelled (VKT);
- reduced greenhouse gases and emissions; and
- increased walking, cycling, and transit use.

There several Cities across Canada have car share facilities incorporated into their transportation network which reduces the reliance of car ownership by allowing vehicles to be shared among a number of individuals. Byway of context, the City of Toronto is among one of the Cities in Canada where a large car share network has been established over the last 15 to 20 years and the benefits of car share can be observed. Other Cities where the car share facilities are provided include the City of Vaughan, City of Calgary, City of Vancouver, City of Montreal and Quebec City.

Byway of context, the City of Toronto defines car-sharing as:

"Car-share" means the practice where a number of people share the use of one or more cars that are owned by a profit or non-profit car-sharing organization and where such organization may require that use of cars be reserved in advance, charge fees based on time and/or kilometers driven, and set membership requirements of the car-sharing organization, including the payment of a membership fee that may or may not be refundable.

The City of Toronto has conducted several studies over the last 15 to 20 years on car-share usage. These studies include a 2009 report entitled *"Parking Standards Review: Examination of Potential Options and Impacts of Car Share Programs on Parking Standards"* and the current City of Toronto *Free-Floating Car-Share Program* which was approved and permanently implemented in July of 2020. These studies consistently show that the convenience of having access to a fleet of vehicles on demand has prompted car-sharers to give up second cars, delay vehicle purchases or forego car ownership entirely. Some estimates in these studies suggest that each car-share vehicle on the road can replace 4 to 8 privately owned vehicles.

In addition, the City of Calgary, has prepared a document entitled *"Calgary Parking Policies"* updated in September 2024, which noted that the provision of car share facilities had reduced vehicle ownership by 10 to 30 percent among car share members.

Both the City of Vaughan and the City of Toronto have policies in place for reducing residential parking spaces with the inclusion of car share parking spaces. The City of Vaughan's comprehensive Zoning By-law permits the "reduction to the total minimum required parking spaces shall be four for each dedicated car-share parking space". Similarly, the City of Toronto includes provisions within Site Specific Zoning By-laws that allow a reduction, typically a reduction of 4 required residential parking spaces for each on-site car share space is provided.

Given the success of the car share programs in the City of Toronto and Vaughan, it is proposed to adopt similar residential parking supply reductions as noted above, that take into account the provision of car share parking spaces provided on-site. It is proposed to adopt a reduction of 4 residential parking spaces for every car share parking space that is provided on-site. It is proposed to provide a minimum of two car share spaces which suggests that the residential parking supply can be reduced by 8 spaces.



6.4 Review of Residential Parking Provisions

BA Group has undertaken a review of the following considerations, as they relate to the site development and site area characteristics to assess the reduced residential parking supply. The following considerations were reviewed:

- A review of the site area context including the downtown Grimsby area, travel characteristics and transportation context;
- The rental and affordable nature of the proposed development;
- Pooled parking considerations as a result of the rental nature of the proposed development;
- Proposed incentives and TDM measures supporting alternative modes of travel; and
- Proposed demographic and community of the building tenants.

6.4.1 Downtown Context

Travel Characteristics

Based on the 2022 Transportation Tomorrow Survey (TTS), approximately 69-74% of home-based peak period trips use a vehicle as their primary mode of travel. Suggesting that there are a portion of trips taken to / from the site that use other mode shares that do not require someone to own a vehicle.

It is noteworthy, that the above noted TTS data was collected prior to the implementation of the NRT On Demand services in 2020 which may have resulted in a reduced auto dependency within the vicinity of the site. Furthermore, with the incorporation of TDM measures for the site, it will further promote alternative mode choices to the site (future details are provided in **Section 5.0**).

Downtown Grimsby Area

The proposed development is situated within walking distance of numerous recreational, commercial, retail, and entertainment amenities and destinations within the Site vicinity and across the Grimsby downtown area. The Site is located within the Downtown District of Grimsby and is located within a 5-minute walk to Main Street, providing convenient access to a vibrant destination with various commercial and employment services.

Notably, the Site is approximately a 3-minute walk from a Food Basics grocery store, BMO, CIBC, TD Bank and a variety of food and beverage options, offering easy access to essential shopping needs. Within an approximate 800-metre radius (10-minute walk) from the Site, future residents have access to several schools including Lakeview Public School, Central French Immersion School, and St. Joseph's Catholic School. Additionally, there are medical services readily accessible, with a medical office and pharmacy located within walking distance of the Site. As further discussed in **Section 4.3**, there are recreational trails within the vicinity of the Site. These amenities collectively enhance the livability and convenience of living in the downtown Grimsby area, making it possible for residents to carry out daily activities without the use of a personal vehicle.

Transit

The level of transit accessibility provided in the area offers non-automobile travel opportunities for both residents and visitors. In 2020, Niagara Region implemented a public transit solution of an on-demand ride-share service in partnership with Niagara Region and Via Mobility. This service allows Town of Grimsby residents to schedule a ride at least 15 minutes before their trip anywhere within the Town or Region including to nearby transit stations. More specifically, service hours for NRT On Demand include 7am to 10pm, seven days a week within the municipal and inter-municipal transportation system with the Niagara Region

Currently, the Site is located within a 10-minute walk cycle or 2-minute car ride to the Grimsby VIA Rail higher-order transit service. The station is on the Toronto – Niagara Falls – New York Line. This train service accesses this station twice a day (once in the morning and in the afternoon).



Regional transit facilities in the vicinity of the site are serviced from the Grimsby GO Bus Stop at the intersection of Casablanca Boulevard / Queen Elizabeth Parkway (QEW). This stop is serviced by the 12 bus (Niagara Falls to Toronto). This bus service runs all day in both directions during the weekdays and weekends having a one-hour headway. This stop is located 3.4 kilometres (or a 5-minute drive) from the site.

Metrolinx has proposed a new Grimsby GO Train station as part of the Niagara Falls Rail Service Extension plan. The Site is located 3.4 kilometres (or a 5-minute drive) from the proposed Grimsby GO Transit Station. Additionally, a private shuttle service is proposed as part of the site development. The shuttle service will provide convenient access to key transit locations including the proposed Grimsby GO Train station.

Pedestrian & Cycling

Pedestrian sidewalks exist on all streets in the vicinity of the site, while some informal cycling facilities exist along portions of Main Street to the east and west of the site, and along Mountain Street to the south of the site. In addition, there are a number of multi-use path routes in the vicinity of the site, which provides an east – west connection between the Hamilton and Niagara Region. The site is located within cycling distance (4 to 6 minutes) and walking distance (8 to 10 minute) of the following routes:

- Bruce Trail
- Forty Mile Creek Side Trail
- Great Lakes Waterfront Trail
- Greenbelt Cycle Route

Off-Site Parking Opportunities

It is notable that there is a substantial supply of commercial parking located within 400 metres (5-minute walk) to the Site. There are 6 commercial public parking lots that collectively provide 567 parking spaces¹. There is opportunities for site residents and visitors to utilize the available area public parking if necessary.

Parking demand studies were conducted by the Town of Grimsby in December 2022 to assess public on-street and off-street parking within the Downtown Grimsby area. The study concluded that the municipal parking supply in Downtown Grimsby can accommodate the existing parking demand. Parking demand studies at the municipal lots in the Downtown Grimsby area are further discussed in **Section 6.5.2**.

Considering the above, the proposed development is situated within walking distance of numerous recreational, commercial, retail, and entertainment amenities and destinations across the Grimsby downtown area. It is also well located relative to cycling and transit infrastructure with connections throughout Niagara Region and to / from Toronto and the site. Additionally, the site is well served by municipal public parking facilities. The site is located in close proximity to a number of non-automobile transportation options, enabling employees and visitors of the site to access the site without the use of a personal automobile.

The downtown context is illustrated in **Figure 6**.

¹ Outlined in Table 2 in Appendix A of the Town of Grimsby's *Phase 1 Report – Strategic Parking Management Strategy*, dated October 2023.



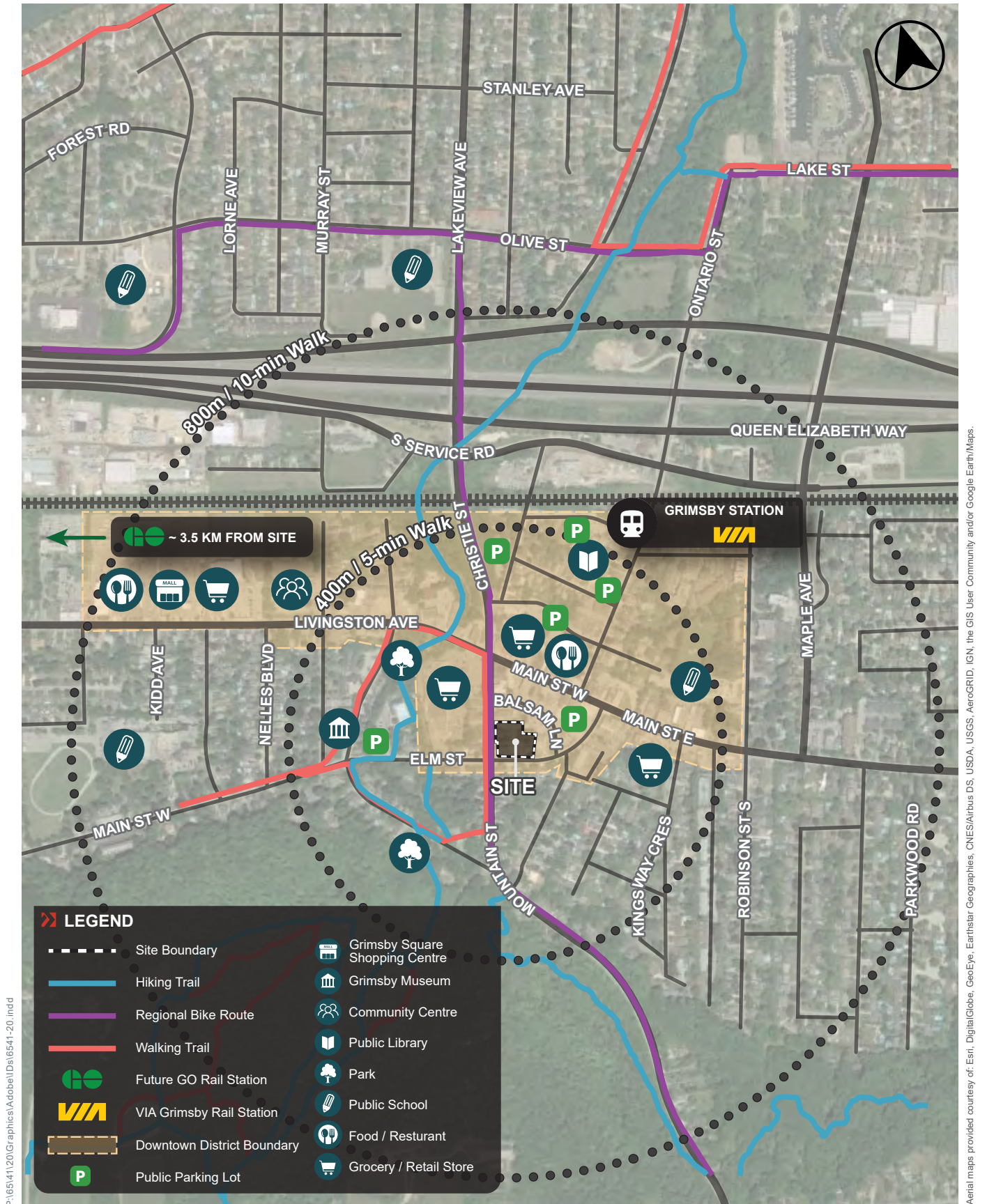


FIGURE 6 DOWNTOWN AREA CONTEXT & DESTINATIONS

6.4.2 Rental and Affordable Nature of Proposed Development

The residential component of the development application is to be constructed and operated as a purpose-built rental building (with a portion as affordable units), which from a parking perspective typically have lower parking demands than owned units. Additionally, the development is being marketed as community-oriented living, similar to senior living communities, which prioritize walkability and convenient access to nearby amenities.

The rental nature of the building allows for parking to be managed as a pooled, non-exclusive resource under a common property management group. Parking will be unbundled from the rental of the apartment unit, encouraging residents to consider alternative mobility options. This approach enables flexible reallocation of parking between units and other uses (e.g., residential visitors and retail) should the parking demand between the uses change over time. Active management of the parking supply will ensure efficient allocation, resulting in higher occupancy rates per stall and a reduced need for overall parking spaces.

Therefore, because the residential parking is not assigned to a particular unit it allows for a more efficient use of the parking supply.

In addition, elsewhere in Ontario, Municipalities have been adopted reduced parking standards to incentivize affordable and purpose-built rental housing developments.

- In January 2025, the City of St. Catharines council passed Zoning By-law Amendment 2025-003 which exempts affordable residential units from the City's current parking standard. The by-law amendment indicates that **"No parking space is required for any affordable residential unit"**. The purpose of this amendment is to support the creation of affordable residential units and increase flexibility of affordable housing providers.
- In July 2024, the Town of Collingwood council passed Zoning By-law Amendment 2024-053 which reduced the parking requirements for apartment buildings to **0.50 parking spaces per unit** from 1.0 parking spaces per unit. This amendment supports the Town's Affordable Housing Master Plan and encourages more homes be built with increased affordability.

Given the above factors, a reduction to the residential parking supply is considered acceptable from a policy perspective.

Grimsby Benevolent Fund Community Services Group

The Grimsby Benevolent Fund (GBF) Community Services group is a non-profit organization which aims to promote wellness in the Grimsby community. The GBF Community Services group provides accommodation aid for low-income households, including rent assistance.

The applicant (Woolverton Holdings Corp.) has corresponded with the GBF Community Services group and has acknowledged that there is interest within the Town of Grimsby to provide units to Grimsby tenants who do not require parking space as they utilize alternative forms of transportation such as Niagara Region Transit (NRT) or taxi services.

The GBF Community Services group has provided a letter (**Appendix J**) highlighting the list of candidates who are interested in renting at the proposed development site and do not rely on personal vehicles.



6.4.3 Incentives Supporting Alternative Modes of Travel

Transportation Demand Management Plan

A comprehensive Transportation Demand Management (TDM) Plan developed for the site has been proposed to leverage the area transportation context in order to reduce vehicular trips made to and from the site. The intent is also to reduce vehicular parking demand. It is our opinion that the proposed TDM Plan is an important supporting element to the proposed residential parking supply. Further details are provided in **Section 5.0**. A summary of the residential related measures are provided below.

- **Reduced Vehicular Parking Supply:** The reduction of parking supply (compared to the applicable requirements) is itself a TDM measure as it will force residents/visitors to consider alternative travel modes.
- **Visible Transit Information:** The lobby of the building should have access to local and regional transit information to assist residents in taking transit.
- **Bicycle Parking:** The proposed development will provide 56 dedicated resident bicycle spaces, meeting and exceeding the Grimsby Zoning By-law requirement.
- **Community Marketing Outreach:** It is recommended that an event should be held around the time of building launch focused on disseminating information about sustainable travel options (i.e. Travel Mode Information Packages, local car share membership information, etc.).
- **Enhanced Pedestrian Facilities:** the provision of continuous walkways, including a central plaza, residential mews, and outdoor amenity area, will improve walkability within and to/from the site.
- **NRT On Demand Transportation Passes:** The proposed development is committed to offer NRT On Demand transportation passes to all tenants for the first year of the rental building's operation.
- **Site Shuttle:** Consideration to provide a private shuttle bus service for residents which would be operated by the building. The objective of this measure is to "reduce" the perceived and effective distance between the site and key transit locations such as the existing VIA Rail Station, Grimsby GO Bus Stop, or the future planned Grimsby GO Station. Further details are provided in **Section 4.2.4.2**.

The robust proposed TDM plan illustrates the developments commitment to providing alternatives to residents in support of a reduced parking supply on site. Additionally, the proposed TDM plan and incentives to improve options for sustainable modes of transportation are inline with the emerging planning policies outlined in **Section 0**.

6.4.4 Residential Parking Summary

Based on the foregoing, a reduction in residential parking supply is considered acceptable from a policy perspective, given the following:

- The site is located within both the Downtown Grimsby and intensification areas.
- The review of other minimum Zoning By-law standards for other areas in similar Municipalities that a reduced residential parking supply is considered to be more appropriate relative to the parking standard trends that are observed in other Municipalities within the GTHA.
- The rental nature of the proposed development allows for parking to be allocated based upon tenanting needs as parking will be provided within one pooled parking area, under one ownership.
- The proposed TDM measures for the site in order to reduce vehicular trips and promote alternate modes of travel such as transit and active transportation.



6.5 Review of Commercial Parking Provisions

BA Group has undertaken a review of the following considerations to assess the appropriateness the shared non-residential parking supply of 40 parking spaces between residential visitor and retail parking uses. The following considerations were reviewed:

- A review of other minimum visitor parking ratios for a selection of Municipalities in the GTHA within a downtown area context in each of the Town and/or City;
- A review of the recent (reduced) parking standards approved in the Town of Grimsby;
- A review of the time-of-day parking demands for the retail and visitor uses provided on the site; and
- A review of recent parking demand surveys collected within the surrounding Town's parking facilities.

6.5.1 Zoning By-law 14-45 Time-of-Day Shared Parking Provisions

The Town of Grimsby takes into account time-of-day shared parking provisions for sites within Mixed-Use Zones, permitting parking to be shared between uses to optimize the parking supply while providing sufficient parking for the uses provided on the property.

Given that the site is located within the Downtown Intensification area in the Town of Grimsby's Official Plan and the fact that the proposed development is comprised of mixed-uses following the redevelopment of the site, it is proposed to adopt shared parking provisions. **Table 6** outlines the shared parking provisions outlined in Zoning By-law 14-45.

Table 6 Town of Grimsby Zoning By-law 14-45 – Shared Parking Occupancy Rate

Land Use	AM (1:00 am – 12:00 pm)	PM (1:00 pm – 5:00 pm)	EVE (6:00 pm – 12:00 am)
Apartment Building	80%	80%	100%
Apartment Building – visitor parking	0%	35%	100%
Retail Store	40%	100%	90%



6.5.2 Review of Commercial Parking Demand

The following sections outline the appropriateness of the retail shared parking occupancy rate. BA Group has further evaluated the shared parking provisions for the retail and visitor uses based on information obtained from the applicant as well as a review of time-of-day parking demand information obtained from other sources such as the Urban Land Institute (ULI) Shared Parking Third Edition dated February 2020, and parking studies conducted in the area.

6.5.2.1 REVIEW OF PARKING DEMAND AT EXISTING PUBLIC PARKING LOT

BA Group has undertaken a parking demand study at the nearby Balsam Lane public parking lot within the Town of Grimsby to better understand the demand levels of the existing public parking areas surrounding the site. The study was conducted on Friday, December 24th, 2021 between the hours of 9:00 a.m. to 7:00 p.m. During the study period the observed parking demands were recorded every hour. The count was conducted on Christmas Eve (December 24th) to capture the public parking demands along Balsam Lane on a “busy” day for retail stores.

Key observations from the survey are the following:

- Parking area supply consists of 162 spaces;
- Observed peak demand occurred at 12:00 p.m. where 131 spaces (81%) were occupied;
- At the observed peak demand 31 spaces remain available;
- For 95% of the time 130 spaces or less are occupied (lot is 80% occupied); and
- After 5:00 p.m., less than **30%** of parking spaces are occupied, resulting in more than half the lot being empty during the evenings when the parking is said to peak for the proposed development as **Table 6**.

A summary of parking demand study along Balsam Lane public parking lot provided below in **Exhibit 2**. Detailed parking demand counts are attached in **Appendix G**.

It is noteworthy, although this count was counted during the ongoing COVID 19 pandemic, there were no lockdown restrictions in place at the time and this day typically is one of the busiest days of the year for retail uses. Therefore, it is a good representation of parking demands in the vicinity of the site.

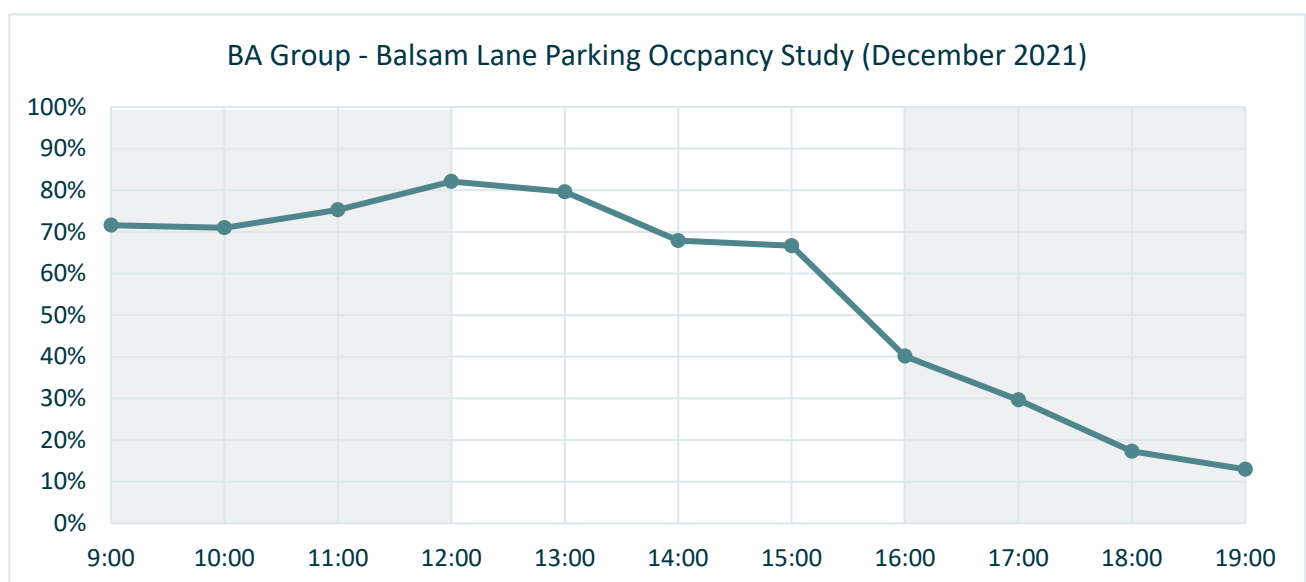


Exhibit 2 Observed Parking Demand versus Parking Supply



The study data suggests that there is an availability of 20% (or 30 available parking spaces) of the existing parking supply when the peak parking demand was observed at 12:00 p.m. meaning that there is more than sufficient parking to meet the requirements for uses surrounding the site and any potential additional parking related to the site could be accommodated.

Additionally, in the evening periods after 5:00 pm, the parking utilization of the Balsam Lane parking lot decreases to less than 30%. The observed parking utilization in the evening periods is significantly lower than the time of day sharing provisions outlined in the Grimsby by-law (**Table 6**) and suggests that there will in fact be additional parking available for other uses as, retail parking demands reduce in the evening periods.

6.5.2.2 REVIEW OF PARKING DEMAND IN DOWNTOWN GRIMSBY

In October 2023, the Town of Grimsby completed the *Phase 1 Report Strategic Parking Management Strategy* which identified the parking needs and opportunities within Downtown Grimsby and Grimsby on the Lake. As part of this study, off-street parking demand was observed in Downtown Grimsby, where a variety of public parking lots and on-street parking areas were surveyed during December 2022 and summer of 2023.

BA Group has conducted a review of the Town's parking study in regard to the off-street public parking lots located in Downtown Grimsby. **Exhibit 3** displays the observed weekday parking utilization observed in the Town study; the summarized data has been taken from *Figure 8* and *Figure 9* from *Appendix A – Data Collection and Results* from the Town report. Details from the Town Study provided in **Appendix G. Exhibit 3** illustrates the parking utilization through the day of all the off-street lots in aggregate and the two busiest surveyed lots – Main Lot and Balsam Lot.

As illustrated in **Exhibit 3** observed peak parking demand does not exceed 90% occupancy (peaking at 1:00 pm) and in the evening period after 6 pm, the observed parking demand drops significantly to no higher than 40% occupancy. The observed public parking demand in the downtown Grimsby area, in which the site is located, maintains a lower than 90% parking occupancy rate in the evening period. The observed parking utilization in the evening periods is significantly lower than the time of day sharing provisions outlined in the Grimsby by-law (**Table 6**) and suggests that there will be additional parking available to be shared with other uses. In addition, the completed study suggests that there is availability in the area off-street parking to accommodate additional overflow of commercial parking for the site, if necessary.

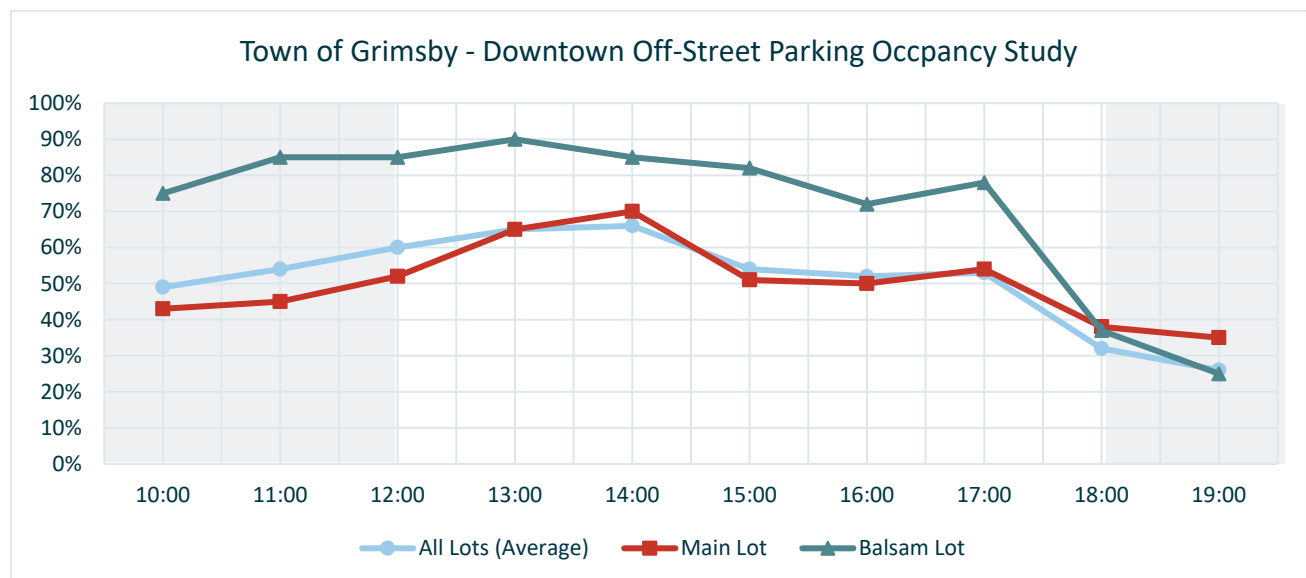


Exhibit 3 Observed Parking Demand versus Parking Supply



6.5.2.3 REVIEW OF URBAN LAND INSTITUTE (ULI) SHARED PARKING

BA Group has undertaken a review of the Urban Land Institute (ULI) Shared Parking Third Edition for retail uses. **Exhibit 4** illustrates the weekday and weekend shared parking variations throughout the day for typical retail uses (non-December time), additional details are provided in **Appendix G**.

As illustrated in **Exhibit 4**, ULI retail parking utilization peaks at 100% usage during the mid-day between approximately 11:00 am to 6:00 pm, aligning with the Town's time of day shared parking rate for retail uses (**Table 6**). In the evenings, after 6:00 pm the retail parking demand declines to below the Town parking utilization rate of 90%.

The ULI evening retail parking occupancy rate of approximately 60% to 70% is significantly higher than the actual observed retail parking occupancy rates surveyed in Downtown Grimsby, as discussed in **Section 6.5.2.1** and **Section 6.5.2.2**. This suggests that the ULI estimate may overstate retail parking demand when compared to actual surveys conducted in Grimsby. Nevertheless, the ULI retail parking occupancy rate remains lower than the 90% shared evening rate specified in Zoning By-law 14-45.

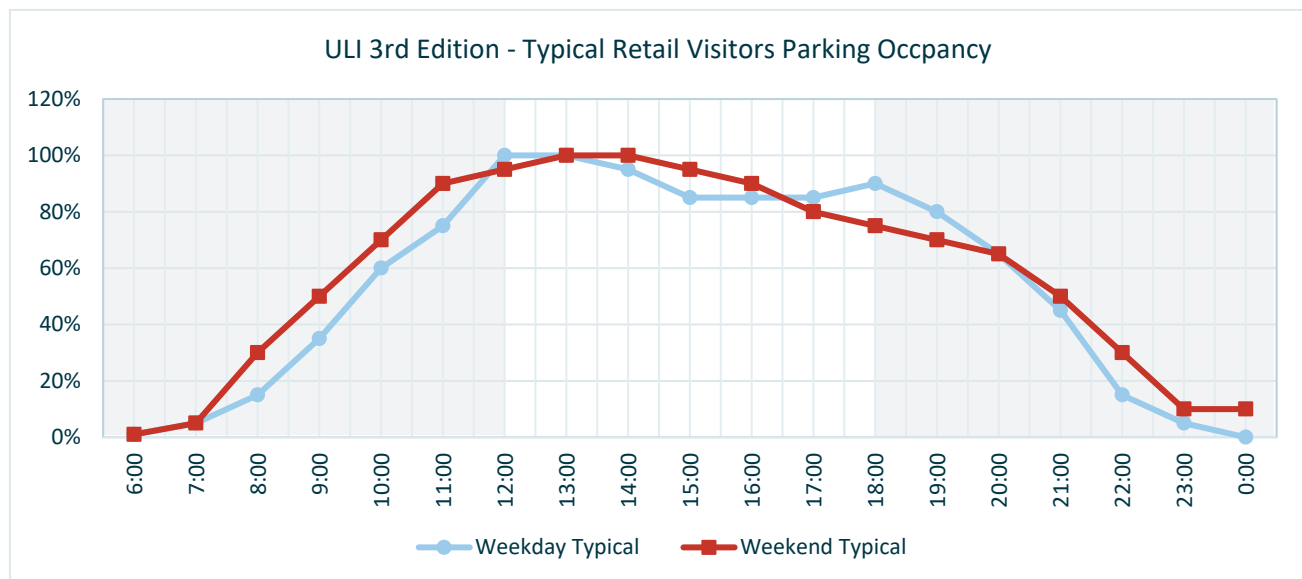


Exhibit 4 ULI 3rd Edition Shared Parking Variation for Typical Retail – Visitors

6.5.2.4 REVIEW OF TIME-OF-DAY PARKING RATES

The preceding sections reviewed time-of-day sharing for retail uses based on number of parking demand surveys conducted in Grimsby by BA Group and the Town of Grimsby, and a review of the Urban Land Institute (ULI) Shared Parking Third Edition for retail uses. These time-of-day shared parking observations were compared to the Town of Grimsby Zoning By-law 14-45 shared parking occupancy rates (**Table 6**). The result of the review found that time-of-day sharing for retail was generally consistent with the Town Zoning By-law in the morning and afternoon periods, however in the evening periods the Town shared parking occupancy rate overstates the observed retail parking demand the forecasted retail parking demands of the site.

The Town's shared parking occupancy rate for retail parking is 90% occupancy, however the reviewed reports and surveys concluded that within downtown Grimsby, of which the site is located, retail parking demand in the evening period is expected to yield 30% to 40% parking occupancy.



With this in consideration, the Zoning By-law shared parking occupancy rate of 90% in the evenings for retail use will overstate the needs of the site. It is proposed to consider a reduce retail shared parking rate, consistent with the observed parking occupancy rates outlined in **Section 6.5.2.1** and **Section 6.5.2.2**.

The above would suggest that there will be additional parking spaces available to be shared between the proposed retail and residential visitor uses.

6.5.3 Proposed Alternative Time-of-Day Shared Parking Provisions

It is proposed to adopt an alternative time-of-day shared parking provision for the retail components on site as indicated in **Table 7**.

Table 7 Proposed Alternative Time-of-Day Shared Parking Provisions

Land Use	AM (1:00 am – 12:00 pm)	PM (1:00 pm – 5:00 pm)	EVE (6:00 pm – 12:00 am)
Apartment Building	80%	80%	100%
Apartment Building – visitor parking	0%	35%	100%
Retail Store	40%	100%	40%

The hours of operation for the uses proposed on the site would be similar to the retail on the site today having hours of operation typically peaking during the daytime and tapering off in the evenings. Furthermore, the parking demands on the evening would be less than the **90% parking allocation** during the evening that is outlined in the By-law (**Section 6.5.1**), therefore allowing for additional parking within the garage to be other uses such as residential visitor uses.

As demonstrated in **Section 6.5.2**, commercial parking demand was surveyed by the Town of Grimsby and by BA Group and resulted in parking occupancy no higher than 40% during the evening periods. Additionally, Urban Land Institute (ULI) predicts an evening retail parking occupancy rate of 60% to 70%, which remains lower than the 90% shared evening rate specified in Zoning By-law 14-45.

With this in consideration, the by-law shared parking occupancy rate of 90% in the evenings for retail use will overstate the needs of the site. It is proposed to consider a **reduce retail shared parking rate** as follows:

- 40% in the morning (1:00 a.m. to 12:00 p.m.);
- 100% in the afternoon (1:00 p.m. to 5:00 p.m.); and,
- **40% in the evening** (6:00 p.m. to 12:00 a.m.).



6.5.4 Review of Visitor Parking

The development proposal for 40 non-residential parking spaces to be shared between residential visitors and retail uses. The proposed parking supply considers a visitor parking supply ratio of 0.20 spaces / unit or 36 parking spaces to be utilized by visitors during peak demand periods.

The following reviews the appropriateness of the reduced reduced residential visitor parking supply of 0.20 spaces / unit recognizing other Municipalities parking visitor parking standards and reduced visitor parking approvals made in Grimsby.

6.5.4.1 REVIEW OF VISITOR PARKING STANDARDS ACROSS THE GTHA

Table 8 provides a summary of comparable residential visitor parking ratios at Municipalities across the GTHA area that have a similar transportation context as the proposed development.

Table 8 Summary of Comparable GTHA Zoning By-law Standards

	Resident Visitor Parking Rates	Applicable Zoning By-law
City of Burlington	0.25 spaces / unit	By-law 2020 (Downtown)
City of Mississauga	0.15 spaces / unit	By-law 0225-2007 (City Centre)
City of Brampton	0.10 spaces / unit	By-law 270-2004 (Central Area / Downtown)
City of Hamilton	No Minimum	By-law 05-200 (Transit Oriented Corridor Zone)
City of St. Catharines	No Minimum	By-law 2013-283 (Downtown)
City of Kitchener	No Minimum	By-law 2019-051 (Urban Growth Ctr. / Downtown)
City of Vaughan	0.15 spaces / unit	By-law 1-88 (VMC)
City of Pickering	0.15 spaces / unit	By-law 7553-17 (City Centre)
Town of West Lincoln	No Minimum	By-law 2017-07
Town of Aurora	0.20 spaces / unit	By-law 6000-17
Town of Niagara on the Lake	No Minimum	By-law 4316-09

These comparable residential visitor parking standards in other GTHA Municipalities range between having no minimum parking standards to a parking standard of 0.25 spaces / unit. The Town of Grimsby's residential parking rate of 0.25 spaces / unit is considered, in or opinion, to be conservatively high by some margin therefore adopting a reduced residential visitor parking ratio of 0.20 spaces per unit is considered to be more appropriate relative to the parking standard trends that are observed in other Municipalities within the GTHA.



6.5.4.2 REVIEW OF REDUCED VISITOR PARKING APPROVALS

BA Group conducted a review of the recent (reduced) residential visitor approvals within the Town of Grimsby. Although there are limited examples of reduced parking supply in the Town of Grimsby, the examples noted below suggests that there is a trend of a reduced visitor parking supply at other prosperities in the vicinity of the site. Particularly, at 27 John Street which is also located within the Downtown area, a reduced residential visitor parking rate of 0.1 spaces per unit was approved for this development. The following outlines examples of where reduced residential visitor parking was approved:

- **Lakehouse Subdivision, Winston Road** (located 4.7 km northwest of the site) – 0.20 spaces / unit visitor parking requirement; and,
- **27 John Street** (located 800 m northeast of the site) – 0.10 spaces / unit visitor parking requirement.

6.5.4.3 REVIEW OFF SITE COMMERCIAL PARKING

There is a substantial supply of commercial parking located within 400 metres (5-minute walk) to the Site. There are 6 commercial public parking lots that collectively provide 567 parking spaces ².

As noted in **Section 6.5.2**, parking studies connected by the Town of Grimsby in December 2022 concluded that the Municipal parking supply in Downtown Grimsby can adequately accommodate existing parking demand. There are opportunities for site visitors to utilize the available area public parking if necessary. In the event where the commercial or visitor parking demand exceeds the supply, the overflow parking can be accommodated by the surrounding area commercial parking.

6.5.5 Non-Residential Parking Summary

Based on the foregoing, the proposed shared non-residential parking supply of 40 parking spaces between residential visitor uses and retail uses is considered appropriate given the following:

- The site is located within both the Downtown Grimsby and intensification areas.
- The review of other minimum Zoning By-law standards for other areas in the GTHA suggest that a reflected residential visitor parking ratio of 0.20 space per unit is considered to be more appropriate relative to the parking standard trends that are observed in other Municipalities within the GTHA.
- There are examples of reduced residential visitor parking supply standards approved in the Town of Grimsby, particularly 27 John Street (0.1 spaces per unit).
- The review of the area public parking facilities suggests that there is available parking in the area.
- The review of the time-of-day-sharing provisions suggests that there will in fact be additional parking spaces in the evening for residential and residential visitor uses as the retail demands reduce in the evening.

Therefore, it is our opinion that the proposed shared non-residential parking supply of 40 spaces meet the demands of the Site as planned.

² Outlined in Table 2 in Appendix A of the Town of Grimsby's *Phase 1 Report – Strategic Parking Management Strategy*, dated October 2023.



6.6 Proposed Vehicular Parking Rates

It is proposed to adopt a reduced parking standard for the site development. A summary of the allocation of the proposed residential and commercial parking supply is provided in **Table 9** and **Table 10**, respectively.

The proposed (reduced) parking standards, results in a minimum of 168 parking spaces (including 121 resident spaces, 2 car-share spaces and 45 commercial spaces) to be provided to support the parking needs of the proposed development. This parking standard includes:

- A reduction in the residential parking supply to an overall effective residential parking supply ratio of 0.728 spaces per unit (from 1.25 spaces per unit) is proposed, accounting for car-share provisions and comprising of 0.81 spaces per unit for market rental units and 0 spaces per unit for affordable rental units.
- Allowance for a reduction of 4 resident parking spaces for every dedicated car-share space provided on-site.
- A reduction in the residential visitor parking supply to 0.20 spaces per unit (from 0.25 spaces per unit);
- An adoption of alternative time-of-day shared parking provisions for retail uses.

Table 9 Proposed Residential Parking Ratio

Parking Provision	Use	Units/GFA	Effective Parking Rate		Parking Supply	
Residential Parking Standard						
On-Site Parking Provisions	Market Rental	159 units	0.76 sps / units	0.68 sps / unit	121 spaces	121 spaces
	Affordable Rental	18 units (10%)	0 sps / unit		0 spaces	
TDM Parking Provisions	Car-share Allowances	2 spaces	For every car share space provided – provide a reduction of 4 resident parking spaces		8 spaces	
Effective Residential Supply	Market Rental	159 units	0.81 sps / unit	0.728 sps / unit	129 spaces	129 spaces
	Affordable Rental	18 units (10%)	0 sps / unit		0 spaces	
Total Provided Residential Parking					121 spaces + 2 car-share spaces	

Notes:

1. Site statistics are based upon site plans prepared by Studio JCI, dated May 16th, 2025.
2. Vehicular parking calculations resulting in a fraction have been rounded up to the nearest whole number in accordance with the requirements outlined in Section 5.2 of the Town of Grimsby Zoning By-law 14-45.



Table 10 Proposed Commercial (Non-Residential) Parking Ratio

Parking Provision	Use	Units/GFA	Parking Rate	Time-of-Day Shared Parking Provisions ⁶				Parking Supply
				Before Sharing	Morning	Afternoon	Evening	
Non-Residential Parking Standard								
Shared Parking Provision	Residential Visitor	177 units	0.20 sps / unit	36 spaces	0 spaces (0%)	13 spaces (35%)	36 spaces (100%)	40 spaces (shared)
	Retail Uses	279 m²	1.0 sps / 28 m² GFA	10 spaces	4 spaces (40%)	10 spaces (100%)	4 spaces (40%)	
Non-Resident Parking Standard Requirement				46 spaces	4 spaces	23 spaces	40 spaces	
Provided Commercial Parking Supply								
On-Site Parking Provisions	Non-Residential – Shared between Residential Visitors and Retail Uses			--				27 spaces ⁷
Off-Site Parking Provisions	Exception 115 of Zoning By-law 14-45 ³							2 spaces
	21 Elm Street Parking Certificate ⁴							1 space
	Cash-in-lieu ⁵							15 spaces
Total Provided Commercial Parking				45 spaces				

Notes:

1. Site statistics are based upon site plans prepared by Studio JCI, dated May 16th, 2025.
2. Vehicular parking calculations resulting in a fraction have been rounded up to the nearest whole number in accordance with the requirements outlined in Section 5.2 of the Town of Grimsby Zoning By-law 14-45.
3. Town of Grimsby Zoning By-law 14-45 Exception 115 (By-law # 95-105) allows the reduction of 2 parking spaces where a road widening has been dedicated for 19 Elm Street.
4. A parking certificate has been obtained for 21 Elm Street permitting payment-in-lieu of one parking space. This payment has been made and the certificate enacted (File No: 5007-221).
5. Town of Grimsby Zoning By-law 14-45 Exception 377 (OLT-22-003541) permits the use of cash-in-lieu for up to a maximum of 15 spaces for any deficiency from the parking requirement.
6. Shared parking provisions between visitor and retail uses are based on Zoning By-law requirements and have been adjusted according to time-of-day sharing as outlined in the by-law and ULI. Further details are provided in **Section 6.5.1**.
7. The on-site provided non-residential parking supply has been calculated by subtracting the permitted off-site parking provisions (18 spaces) from the proposed commercial supply (45 spaces).



6.7 Review of Non-Standard Parking Spaces

6.7.1 Town of Grimsby Zoning By-law Dimensions

The Town of Grimsby Zoning By-law 14-45 requires that parking spaces be a minimum of 2.75 metres wide by 5.75 metres long with an adjacent drive aisle width of 6.0 metres.

The majority of parking spaces located within the parking garage of the proposed building comply with the Zoning By-law parking space dimensional requirements. Eight (8) spaces out of the proposed 150 parking spaces (or approximately 5 percent of the total parking supply) do not comply with the dimensional standards under Zoning By-law 14-45.

The following sections provide a review of the functionality of these eight (8) “non-standard” parking spaces considering the vehicle manoeuvring needs. It is noteworthy that all eight (8) spaces are considered to be non-standard relative to the length of the space.

6.7.2 Inventory of Proposed Non-Standard Parking Spaces

A total of eight (8) out of the 150 on-site parking spaces are considered to be deficient relative to Zoning By-law 14-45 dimensions, as noted above. These spaces are considered to be non-standard spaces and represent 5% of the total parking supply. The dimensions of the proposed non-standard spaces are summarized in **Table 11** and are categorized as follows:

- Three (3) length deficient spaces - 5.00 metres length by 2.75 metres width.
- Five (5) length deficient spaces - 5.55 metres length by 2.75 metres width.

An illustrative set of non-standard plans (Drawings SC-01 to SC-03) showing the locations and dimensions of the small car parking spaces within the proposed parking facility are provided in **Appendix H**. The eight (8) non-standard spaces are summarized in a colour coding fashion in **Table 11** identical to the colour scheme used in drawings SC-01 to SC-03.

Table 11 Non-Standard Parking Space Inventory

Level	Space Label	Space Length (m)	Space Width (m)	Aisle Width (m)	Deficiency
Intermediate Floor	SC-01	5.00	2.75	7.00	Length
Intermediate Floor	SC-02	5.00	2.75	7.00	Length
Intermediate Floor	SC-03	5.00	2.75	7.00	Length
Intermediate Floor	SC-04	5.55	2.75	6.00	Length
Ground Floor	SC-05	5.55	2.75	7.00	Length
Ground Floor	SC-06	5.55	2.75	7.00	Length
Ground Floor	SC-07	5.55	2.75	6.00	Length
P1	SC-08	5.55	2.75	6.00	Length

Types of Non-standard Spaces:

	Reduced length (5.00m) non-standard parking space
	Reduced length (5.55m) non-standard parking space



6.7.3 Adequacy of Non-Standard Parking Spaces

The following sections provide a review of the adequacy of the eight (8) “non-standard” parking spaces.

6.7.3.1 BASIS OF NON-STANDARD PARKING SPACE REVIEW

The functionality of the proposed “non-standard” parking spaces has been reviewed based on:

- The ability of these spaces to accommodate a wide range of the vehicle lengths and widths prevalent in the passenger vehicle fleet used today; and,
- The ability to manoeuvre into/out of the spaces.

This assessment has been undertaken considering the range of lengths and widths of vehicles being used today in Town’s such as Grimsby.

6.7.3.2 REVIEW OF PASSENGER VEHICLE LENGTHS

The functionality of the “non-standard” parking spaces has been reviewed based upon the categorization outlined in this report and considers the range of lengths and widths of the vehicles that are available for purchase by consumers.

BA Group has further undertaken a review of vehicle sizes based on the top 100 bestselling passenger car, SUV and van vehicles sold across Canada between 2013 and 2022, which suggests the following:

- The top 100 bestselling vehicles across Canada represents on average 91% of the total annual sales between 2013 - 2022;
- The 95th percentile vehicle has a length of 5.14 metres, width of 2.00 metres, and height of 1.82 metres.
- The 85th percentile vehicle has a length of 4.99 metres, width of 1.96 metres, and height of 1.75 metres.
- The 75th percentile vehicle has a length of 4.88 metres, width of 1.91 metres, and height of 1.71 metres.

A list of vehicles that have a length of approximately 5.00 metres or less is provided in **Table 12**. The majority of these vehicles are in the top 100 vehicle models sold in Canada each year between 2013 and 2022.

Table 12 Sample Vehicle Models and Associated Lengths

Model	Average Length of Model between 2013 and 2022	Length of 2022 Model
Ford Explorer	5.03m	5.05m
Honda Accord	4.88m	4.88m
BMW X5	4.90m	4.93m
Toyota Camry	4.86m	4.89m
Toyota Highlander	4.89m	4.95m
Subaru Outback	4.83m	4.86m
Ford Edge	4.77m	4.80m
Nissan Rogue	4.64m	4.64m



Model	Average Length of Model between 2013 and 2022	Length of 2022 Model
Toyota Corolla	4.61m	4.64m
Mazda 3	4.52m	4.46m
Toyota RAV4	4.58m	4.59m
Honda Civic	4.58m	4.55m
Honda CR-V	4.57m	4.59m
Hyundai Elantra	4.57m	4.67m
Ford Escape	4.56m	4.59m

A summary of the car sales information including vehicle / model sizes is attached in **Appendix H**.

6.7.3.3 SELECTED DESIGN VEHICLES

An important consideration when assessing the length of a vehicle that can reasonably park within a parking space is the inclusion of an allowance for bumper clearance between a structural wall that may be situated at the front of the parking space, recognizing that motorists seldom pull completely into a parking space. A bumper clearance of 0.20 metres is commonly used. This would suggest that all parking spaces of 5.55 metres can accommodate the upper end of the design vehicle length (i.e. 5.35 metres + 0.20 metres), considering the 95th percentile vehicle length based upon sales data. Moreover, this suggests that parking spaces of 5.00 metres can accommodate vehicles with lengths of 4.80 metres.

Design vehicles have been selected for the purpose of reviewing the functionality of the 5.00 metre length and 5.55 metre length non-standard parking spaces. The design vehicles are based upon recent vehicle sales information collected by BA Group.

The length of the design vehicle used in the functional review of the three 5.00 metre length non-standard parking spaces reflects a passenger vehicle that is equivalent to the 60th percentile length characteristic of the passenger car fleet in use today. The dimensions of the design vehicle are as follows:

- A vehicle length in the order of 4.75 metres.

These dimensions are approximately equivalent to a 2021 Tesla Model Y.

The length of the design vehicle used in the functional review of the five 5.55 metre length non-standard parking spaces reflects a passenger vehicle that is equivalent to the 95th percentile length characteristic of the passenger car fleet in use today. The dimensions of the vehicle are as follows:

- A vehicle in the order of 5.15 metres.

These dimensions are approximately equivalent to a 2012 Dodge Grand Caravan.

6.7.3.4 MANOEUVRING INTO/OUT OF PARKING SPACES

The ability of the design vehicle to manoeuvre into / out of the “non-standard” parking space is an important consideration. Turning movements of the design vehicles as noted above have been tested for representative length-deficient spaces. Vehicular manoeuvring diagrams are included in **Appendix H**, demonstrating the ability of the design vehicles to acceptably manoeuvre into and out of these parking spaces.



6.7.3.5 ANALYSIS OF 5.00 METRE LENGTH-DEFICIENT PARKING SPACES

Three (3) length-deficient spaces SC-01, SC-02 and SC-03 are located on the intermediate floor and are considered deficient relative to the length of the parking space having dimensions of 5.0 metres in length and width of 2.75 metres. The analysis of these three (3) parking spaces is as follows:

- Overall stall width is 2.75 metres and 5.00 metres in length with 7.00 metres aisle width;
- These spaces do not accommodate the 95th percentile design vehicle length; however, they accommodate the 2021 Tesla Model Y, 60th percentile design vehicle length;
- Although the spaces can not accommodate the 95th percentile design vehicle length these three spaces can accommodate the 60th percentile design vehicle length which still represents a sizable vehicle population that are sold across Canada.
- Manoeuvring is acceptable. Refer to drawing no.: VMD-01, VMD-02, VMD-03 in **Appendix H**; and,
- It is recommended that these three (3) spaces should be signed as small car parking spaces and disclosed as non-standard parking spaces in rental agreements.
- These three spaces represents 2% of the total parking supply and because the parking supply is provided as a pooled parking supply there is flexibility to assigning these spaces to ensure that a vehicle can be accommodated within these spaces.

Based upon the above we consider parking spaces SC-01, SC-02 and SC-03 acceptable.

6.7.3.6 ANALYSIS OF 5.55 METRE LENGTH-DEFICIENT PARKING SPACES

Five (5) length deficient spaces are located on the P1 floor, ground floor and intermediate floor and are considered deficient relative to the length of the parking space having dimensions of 5.55 metres in length and a width of 2.75 metres as illustrated in SC-04 to SC-08. The analysis of these five (5) parking spaces is as follows:

- Overall stall width is 2.75 metres and 5.55 metres in length with minimum 6.00 metres aisle width;
- These spaces accommodate the 95th percentile design vehicle length, approximately equivalent to a 2012 Dodge Grand Caravan.
- Manoeuvring is acceptable. Refer to drawing no.: VMD-04, VMD-05, VMD-06, VMD-07, VMD-08 in **Appendix H**; and,
- It is recommended that these spaces be disclosed as non-standard parking spaces in rental agreements.

Based upon the above we consider parking spaces SC-04, SC-05, SC-06, SC-07 and SC-08 acceptable.

6.7.4 Summary of Non-standard Parking Spaces

The proposed eight (8) “non-standard” parking spaces can, based upon the above and notwithstanding their dimensions, reasonably accommodate a wide range of passenger vehicles that residents may own and wish to park within the proposed parking development garage.

It should be noted that the SC-01, SC-02 and SC-03 parking spaces were the only spaces tested using a representative 60th percentile vehicle length (2021 Tesla Model Y). SC-01, SC-02 and SC-03 can generally accommodate the 60th percentile vehicle length. Given that these spaces can generally accommodate the 60th percentile vehicle length, it is recommended to provide a “Small-Car” sign at the front of the parking space.



The eight (8) length deficient small car spaces SC-01, SC-02, SC-03, SC-04, SC-05, SC-06, SC-07 and SC-08 should be signed and disclosed in rental agreements as non-standard spaces.

6.8 Parking Summary

The proposed parking supply includes a total of 168 parking spaces including **150 on-site parking spaces** within a 3-level parking garage and 18 off-site spaces. The proposed breakdown of parking is as follows:

- Residential Parking 121 spaces (excluding 6 tandem parking spaces)
- Commercial Parking 45 spaces (including 27 on-site spaces, and 18 off-site spaces)
- Car-Share 2 spaces
- **Total Provided On-Site 150 parking spaces**

From a policy perspective, the proposed development aligns with local and regional policies promoting sustainable urban growth and a reduced reliance on personal vehicles.

Given the policies outlined in the Niagara Region OP and the Town's OP, it is anticipated that the intensification of the area will lead to a decrease in vehicle ownership within the downtown area. In addition, the proposed development is conveniently located within walking distance of a variety of recreational, commercial, retail, and entertainment amenities throughout the Grimsby downtown area. The site also benefits from easy access to cycling and transit infrastructure (via proposed Shutte Service), with connections extending throughout the Niagara Region and to/from Toronto. It is plausible that future residents and visitors of the development can easily access the Site without relying on personal vehicles.

The proposed residential parking supply and commercial parking supply (shared on a non-exclusive basis between residential visitors and retail uses) align with on-going trends supportive of reduced parking supply and the prioritization of more sustainable travel choices over automobiles.

In summary, the combination of robust TDM measures, site context, and alignment with regional and locally policy objectives demonstrate that a reduced parking supply is supportable within the Downtown Intensification area of Grimsby.



7.0 BICYCLE PARKING

7.1 Bicycle Parking Requirements

The Town of Grimsby Zoning By-law 14-45 bicycle parking standards have been applied to the site's proposed statistics and are summarized in **Table 13**.

Table 13 Zoning By-law 14-45 Bicycle Parking Requirements

Building Use	Units / GFA	Bicycle Parking Standard	Required Bicycle Spaces
Apartment Building	177 units	0.3 spaces per unit	54 spaces
Commercial (Retail)	279 m² GFA	7% of required vehicle parking	1 space
	10 parking spaces		
Total Bicycle Parking Requirements			55 spaces

Notes:

1. Site statistics are based upon site plans prepared by Studio JCI, dated May 16th, 2025.

Application of the Town of Grimsby Zoning By-law 14-45 bicycle parking standards to the proposed development results in a required provision of 55 bicycle parking spaces, 54 spaces for residential tenant and visitor use and 1 space for non-residential uses.

7.2 Proposed Bicycle Parking Supply

The development proposal includes a total of 56 bicycle parking spaces, including 54 residential and 2 non-residential bicycle parking spaces.

The proposed residential tenant and visitor use bicycle spaces are located on the first level of the building, in a secure bike room and close to the main entrance with convenient elevator access. The proposed non-residential bicycle spaces are located at-grade adjacent to the commercial entry at the south-east corner of the site.

The proposed bicycle parking supply facilities and supporting access arrangements, based upon the above, are appropriate and will adequately support the proposed non-residential development as planned.



8.0 LOADING

8.1 Loading Zoning By-Law Requirements

Application of the loading requirements outlined in the Town of Grimsby Zoning By-law 14-45 to the proposed development statistics, results in a requirement of one (1) loading space.

A summary of the minimum loading requirements for the proposed development is provided in **Table 14**.

Table 14 Zoning By-law 14-45 Loading Requirements

Building Use	Proposed GFA (m ²)	Range of GFA (m ²)	Loading Space Requirement
Commercial (Retail)	279 m ²	251 – 2,350	1 space
Total Loading Space Requirement			1 space

Notes:

1. Site statistics are based upon site plans prepared by Studio JCI, dated May 16th, 2025.

8.2 Proposed Loading Supply

Following the above-listed Zoning By-law loading requirement, the proposed development plan incorporates one (1) loading space at-grade, in a designated loading area. The space is provided to facilitate loading/unloading, moving activity, delivery and refuse collection needs of the building.

Refuse and recycling facilities for both residential and non-residential uses are provided within the loading area. The proposed development refuse/recycling collection will be serviced by a private contractor and will not seek the Regional Municipality of Niagara Waste Collection services.

The proposed loading supply of one (1) loading space meets the standards outlined in Town of Grimsby Zoning By-law 14-45.

Vehicle manoeuvring diagrams (VMDs) are provided in **Appendix I** and illustrate the manoeuvring needs of various design vehicles entering and exiting the proposed loading space. These diagrams confirm that the proposed loading arrangements are appropriate and will facilitate the manoeuvring requirements of the vehicles that are expected to access the site.

The design vehicles used to assess the proposed loading spaces are as follows:

- Overhead Refuse Collection Vehicle (Turtle Island Garbage – Front Loader);
- TAC Single Unit Design Vehicle (TAC - SU);
- TAC Light Single Unit Vehicle (TAC – LSU);
- Cube Van (Ford E350).



9.0 TRAVEL DEMAND FORECASTS

9.1 Residential Person Trip Generation

Residential site person trip generation rates are determined based upon ITE Trip Generation Manual (11th Edition) code 221 – Multifamily Housing (Mid-Rise). The retail uses on the site are limited to two ground floor commercial units of approximately 140 m² each. The retail component of the proposal is considered ancillary and is not anticipated to generate a substantial number of new trips during the weekday peak hours.

Table 15 summarizes residential trip generation rates for the morning and afternoon peak hours.

Table 15 Proxy Person Trip Generation Rates

Rate	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Prevailing ITE Trip Generation Rate: ITE 221 – Multifamily Housing, General Urban/Suburban, Not Close to Rail Transit	0.11	0.37	0.48	0.31	0.22	0.53
Adopted Person Trip Rate (Trips / Dwelling Unit)	0.11	0.37	0.48	0.31	0.22	0.53

The rates summarized above were used to generate person trips for the proposed development.

9.2 Residential Travel Mode Split

Modal share characteristics for resident (home-based) travel during the morning and afternoon peak hours are summarized in **Table 16** and are based on the 2022 Transportation Tomorrow Survey (TTS) data. Detailed queries are provided in **Appendix C**.

Table 16 Residential Travel Mode Share (TTS 2016)

Mode	Inbound Trips	Outbound Trips
Auto Driver	74%	69%
Auto Passenger	16%	21%
Transit	1%	1%
Cycle	3%	3%
Walk	6%	6%
Total	100%	100%

Notes:

1. Based on the 2022 TTS home-based trip results for weekday morning (6:00-8:59) and afternoon (15:00-17:59) peak periods for 2006 GTA zones 6008-6010 and 6014-6017.

The TTS travel data demonstrates that a portion of home-based travel in the site-surrounding area is undertaken using sustainable means of transportation. Approximately 10% of all home-based trips are made using transit, walking, or cycling. The surrounding area has an auto driver mode share in the order of 74% and 69% for inbound and outbound trips, respectively.



9.3 Site Residential Person Trips

Person trip generation rates were established for the proposed development based on prevailing rates from the ITE Trip Generation Manual (11th Edition). Subsequently, area mode shares were applied to forecast person trips to estimate the number of person trips using each travel mode. **Table 17** summarizes the person trips associated with the proposed development.

Table 17 Site Residential Person Trips

Parameter	Base Assumptions					
Residential Dwelling Units	177 units					
	AM Peak Hour			PM Peak Hour		
	Inbound	Outbound	2-Way	Inbound	Outbound	2-Way
<i>Adopted Person Trip Rates</i>						
Peak Hour Person Trip Rate ITE 221 – Multifamily Housing (Mid-Rise) (trips / unit)	0.11	0.37	0.48	0.31	0.22	0.53
Forecast Residential Person Trips (177 units)	20	65	85	55	40	95
<i>Person Trips by Travel Mode</i>						
Auto Driver	15	45	60	40	25	65
Auto Passenger	5	15	20	10	10	20
Transit	0	0	0	0	0	0
Cycle	0	0	0	0	0	0
Walk	0	5	5	5	5	10
Total Residential Person Trips	20	65	85	55	40	95

Notes:

1. All trips rounded to the nearest 5 trips.

The proposed development is forecast to generate approximately 85 and 95 total two-way residential person trips during the weekday morning and weekday afternoon peak hours, respectively.



9.4 Site Retail Trips

Retail uses on the site are expected to be operate primarily as ancillary retail, serving the local area and the proposed development itself. However, given that proposed parking facilities for the site include 22 on-site parking spaces shared between residential visitors and commercial uses, vehicle trips associated with retail uses have been forecasted. Vehicle trip generation rates were established based on prevailing rates from the ITE Trip Generation Manual (11th Edition).

Table 18 Site Residential Person Trips

Parameter	Base Assumptions					
Retail GFA	279 m ²					
	AM Peak Hour			PM Peak Hour		
	Inbound	Outbound	2-Way	Inbound	Outbound	2-Way
<i>Adopted Person Trip Rates</i>						
Peak Hour Vehicle Trip Rate ITE 822 – Strip Retail Plaza (trips / 100 m ² GFA)	1.32	0.88	2.19	3.06	3.06	6.12
Forecast Retail Vehicle Trips (279 m²)	5	0	5	10	10	20

The retail uses on the site are forecasted to generate in the order of 5 and 20 vehicle trips during the weekday morning and afternoon peak hours, respectively. Given the relatively small amount of retail space, split between separate units within the development, the forecasted vehicle trips are considered to be very conservative.



10.0 TRAFFIC VOLUME FORECASTS

10.1 Forecasting Horizons and Scenarios

The traffic volume forecast and traffic analysis have been completed for the following weekday morning and afternoon peak hour scenarios:

- Existing (2025) – This scenario includes existing traffic volumes based on turning movement counts.
- Future Background (2030) – This scenario includes future area background growth for the anticipated opening year of the proposed development, without site traffic volumes associated with the proposal.
- Future Total (2030) – This scenario includes future area background growth as well as site traffic volumes for the anticipated opening year of the proposed development.
- Future Background (2035) – This scenario includes future area background growth five years after the opening year of the proposed development, without site traffic volumes associated with the proposal.
- Future Total (2035) – This scenario includes future area background growth five years after the anticipated opening year of the proposed development, including site traffic volumes.

10.2 Existing Traffic Volumes

Existing traffic volumes for vehicles, cyclists and pedestrians were established for the weekday morning and afternoon peak hour periods on the area street network based upon intersection turning movement count information undertaken on behalf of BA Group.

Weekday morning peak hour counts collected in September 2024 were considered to be indicative of normal 2024 conditions. A growth rate of 2% for one year was applied to through movements along all the corridors in the study area to represent 2025 conditions, consistent with the growth assumptions described in **Section 10.3**.

Weekday afternoon peak hour counts taken in September 2024 were not considered to be indicative of normal traffic patterns, due to the closure of the east leg of the intersection of **Christie Street – Mountain Street / Main Street**. Normal 2024 operating conditions for the weekday afternoon peak hour were estimated by applying a growth rate of 2% for five years to all movements at the intersection, beginning with previous turning movement counts collected in 2019.

The closure of the section of Main Street between Mountain Street and Elm Street during the weekday afternoon peak hour resulted in abnormally high traffic flows on certain movements at the intersection of **Mountain Street / Elm Street**, including the eastbound and westbound through movements, the southbound left-turning movement, and the westbound right turning movement. For this intersection, turning movement counts collected in 2023 were adopted for those movements that were impacted by the closure, to better represent conditions prior to the closure. For all other movements at the intersection of **Mountain Street / Elm Street**, 2024 counts were adopted.

Further adjustments were made to the weekday afternoon peak hour base traffic volumes to maintain general consistency and balancing between intersections, including the reduction of volumes for movements at the intersection of **Mountain Street / Balsam Lane** that appeared abnormally high due to the road closure on Main Street. Further growth at a rate of 2% for one year was applied to through movements along all the corridors in the study area to represent 2025 conditions, consistent with the growth assumptions described in **Section 10.3**. The resulting weekday afternoon peak hour traffic volumes represent a conservative estimate of normal operating conditions in 2025.



A summary of the turning movement count dates and sources is provided in **Table 19**. Detailed turning movement count summaries are provided in **Appendix D**.

Table 19 Turning Movement Count Summary Information

Intersections	Count Date	Conducted By
Christie Street – Mountain Street / Main Street	Thursday, September 26 th , 2024	Spectrum (BA Group)
Mountain Street / Elm Street		
Mountain Street / Shopping Centre Access – Balsam Lane		
Mountain Street / Site Access		
Christie Street / South Service Road – Clarke Street	Tuesday, November 12 th , 2024	Spectrum (BA Group)
Mountain Street / Elm Street	Wednesday, September 27 th , 2023	
Christie Street – Mountain Street / Main Street	Tuesday, April 9 th , 2019	Niagara Region

Adopted existing area traffic volumes for the weekday morning and afternoon peak hour periods are illustrated in **Figure 7**.



Date Plotted: May 22, 2025 Filename: P:\6541\20\Graphics\CAD\Fig07-02-EX.dwg

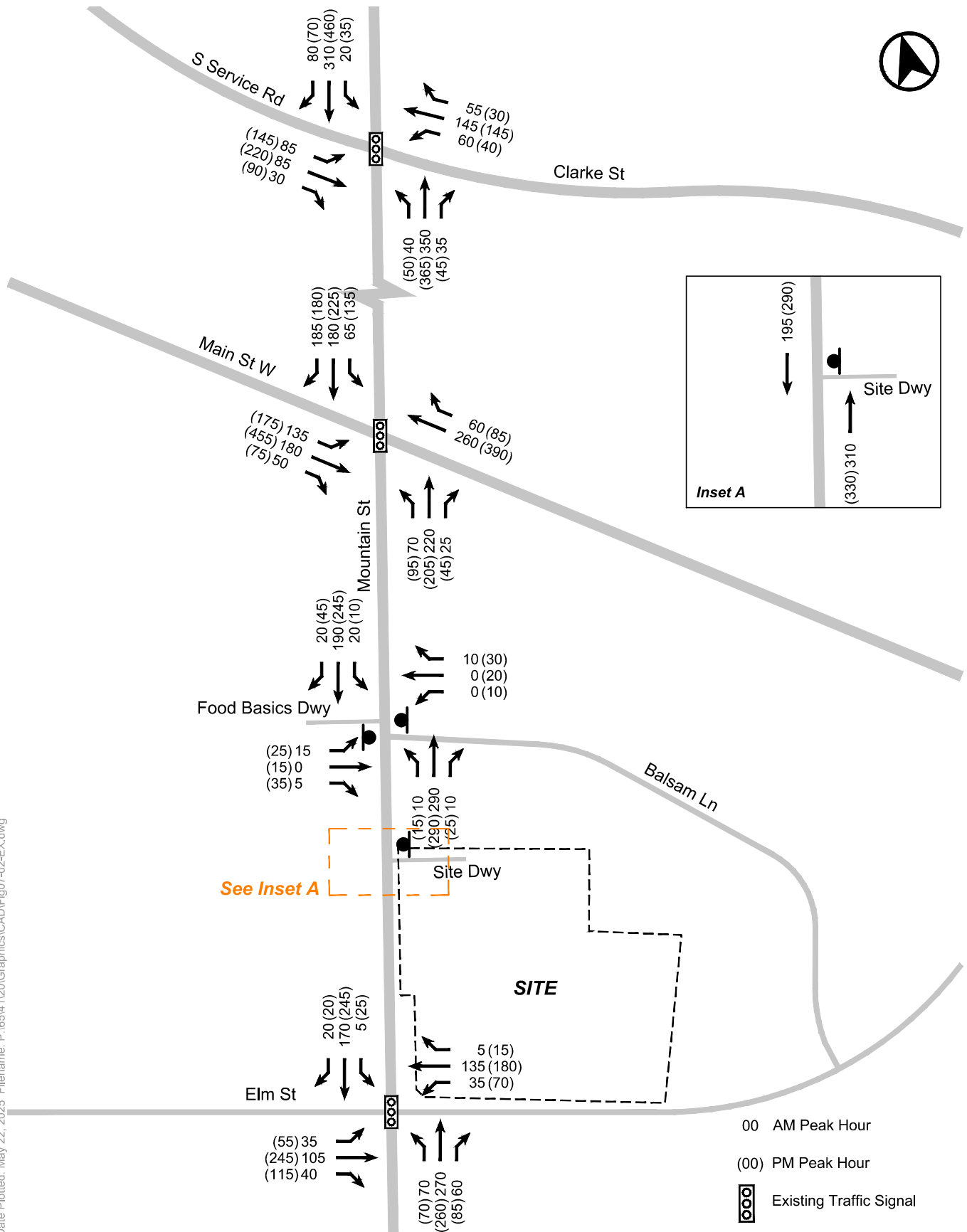


FIGURE 7 EXISTING TRAFFIC VOLUMES

10.3 Background Traffic Volumes

Background traffic growth forecasts are based solely on general corridor growth, as there are no planned developments near to the study area that would contribute additional traffic volumes.

General Corridor Growth

In accordance with the *Niagara Region Guidelines for Transportation Impact Studies* (2012), a growth rate of 2% per year was applied to through movements along each corridor in the study area, including Main Street, Mountain Street, Christie Street, Elm Street, South Service Road and Clarke Street. Corridor growth traffic allowances for the 2030 and 2035 horizons are illustrated in **Figure 8** and **Figure 9**, respectively.

Future Background Traffic Volumes

Future background traffic volumes are the sum of existing traffic and general corridor growth traffic allowances. Future background traffic volumes for the 2030 and 2035 horizons are illustrated in **Figure 10** and **Figure 11**, respectively.



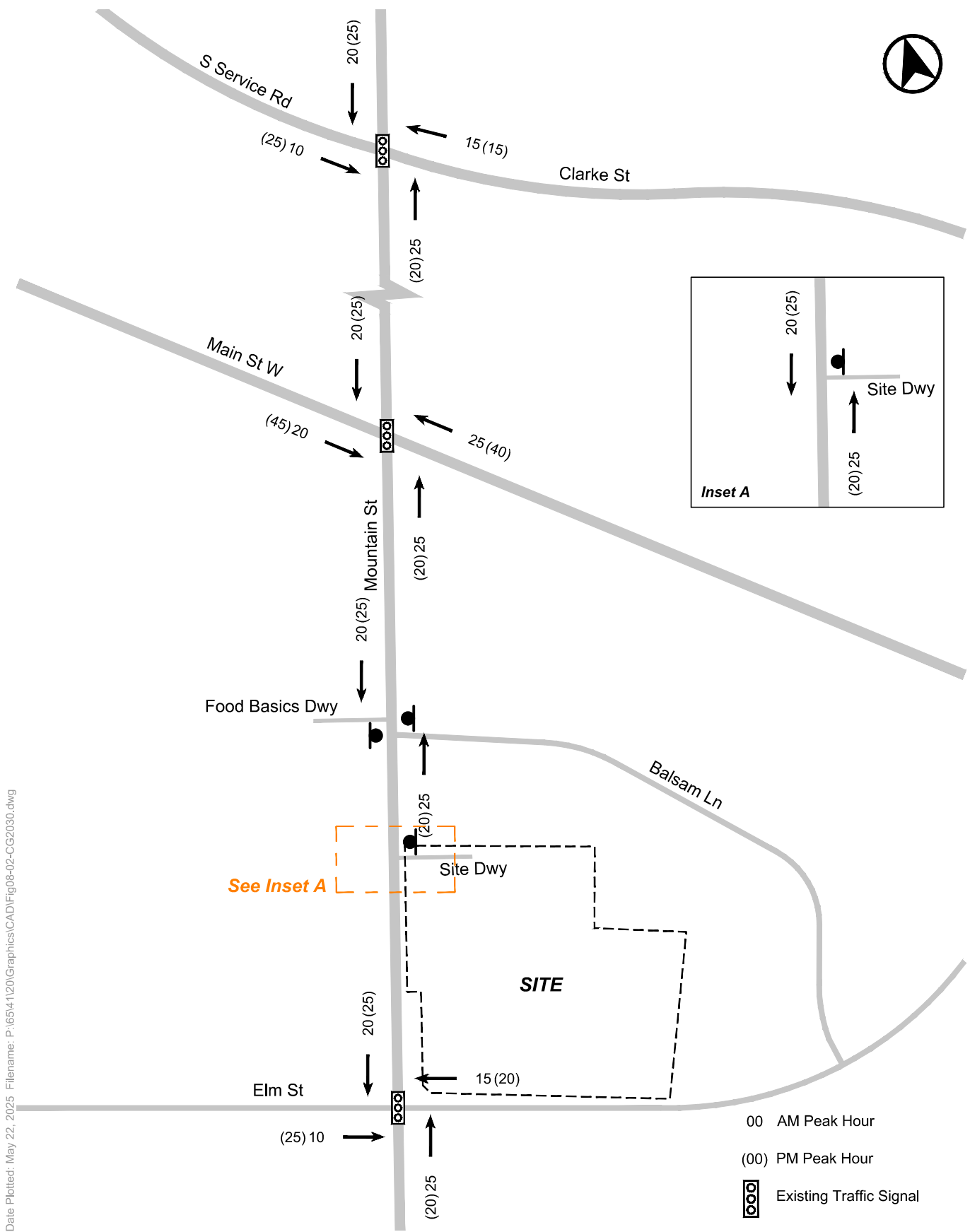


FIGURE 8 CORRIDOR GROWTH VOLUMES - 2030 HORIZON

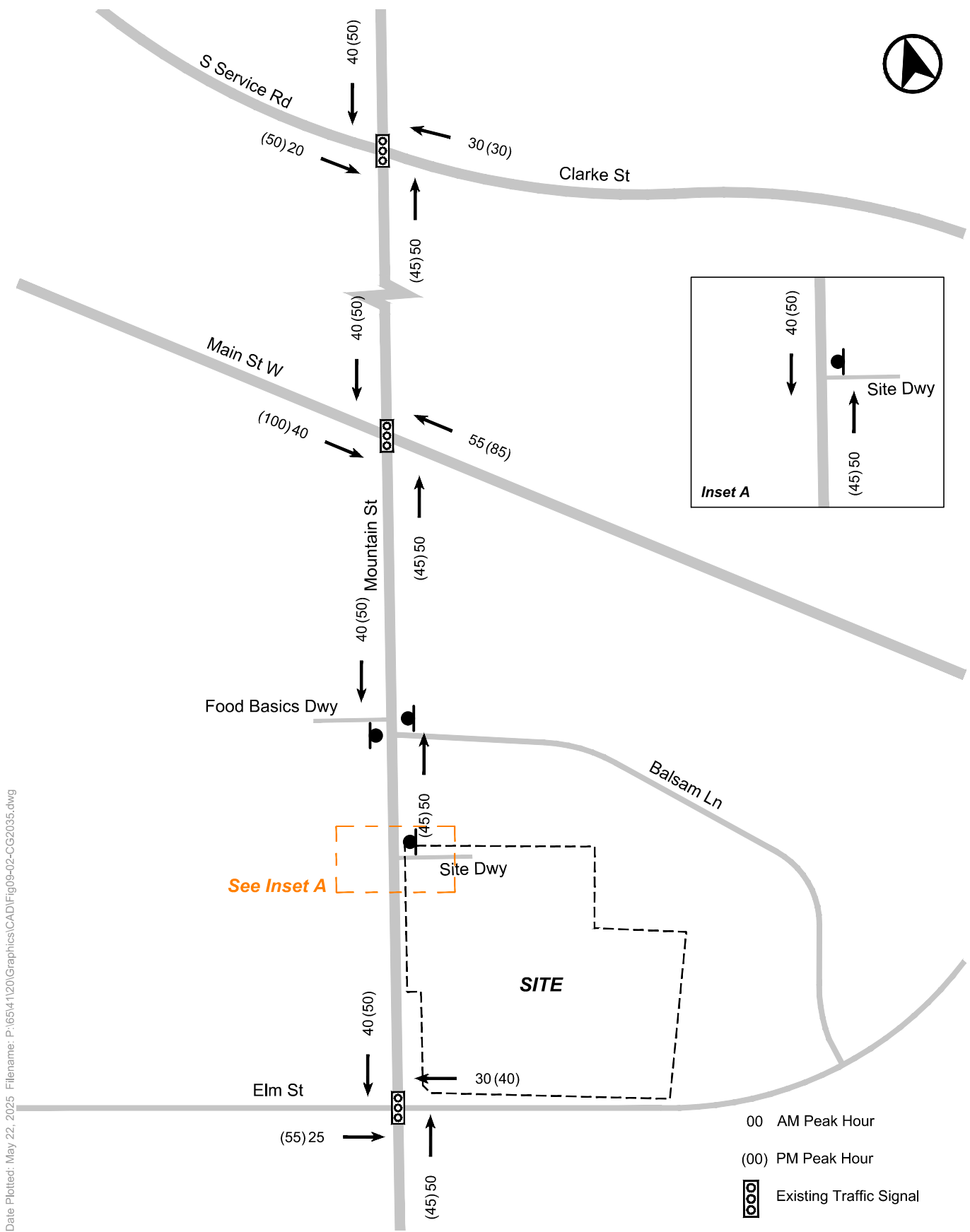


FIGURE 9 CORRIDOR GROWTH VOLUMES - 2035 HORIZON

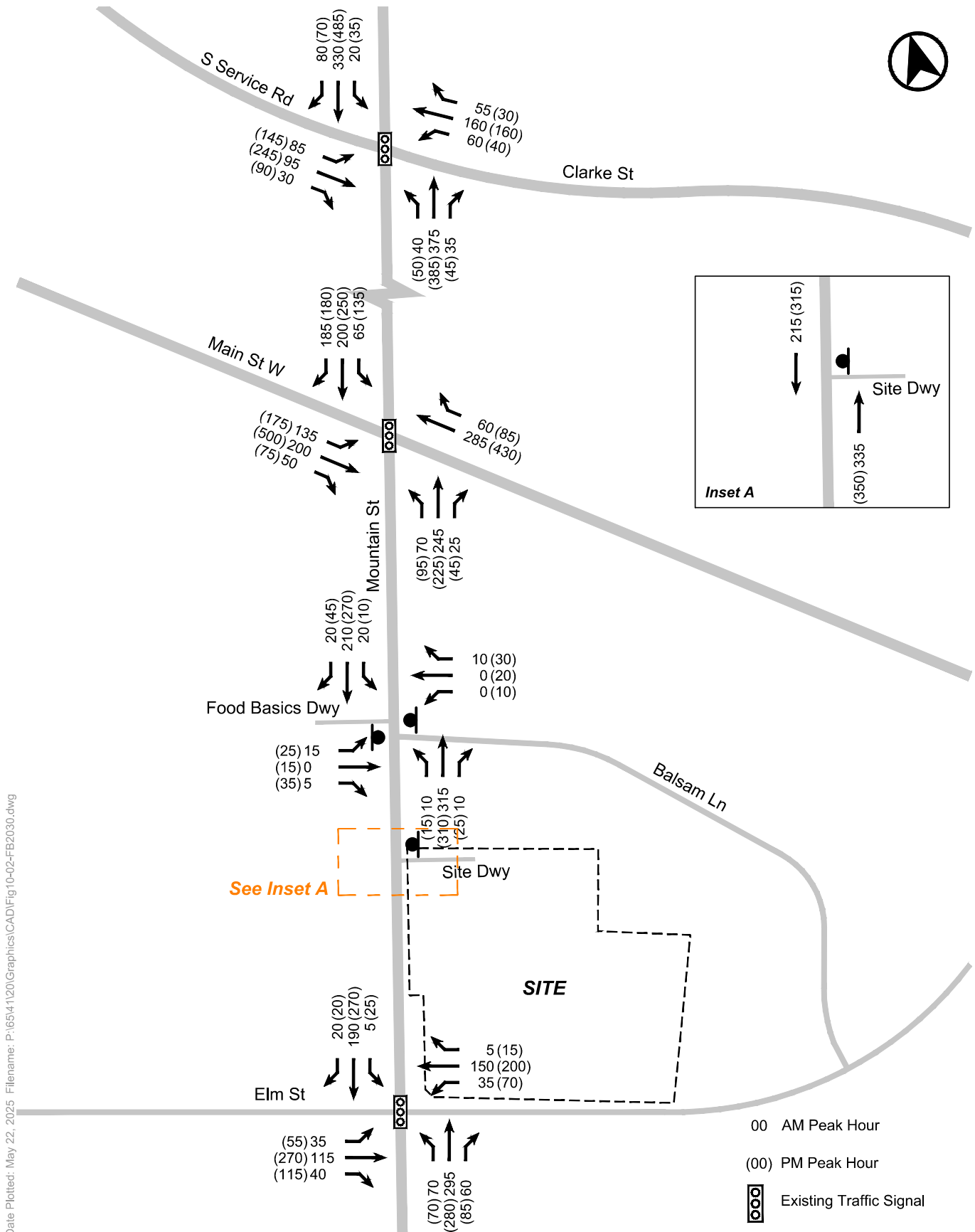


FIGURE 10 FUTURE BACKGROUND TRAFFIC VOLUMES - 2030 HORIZON

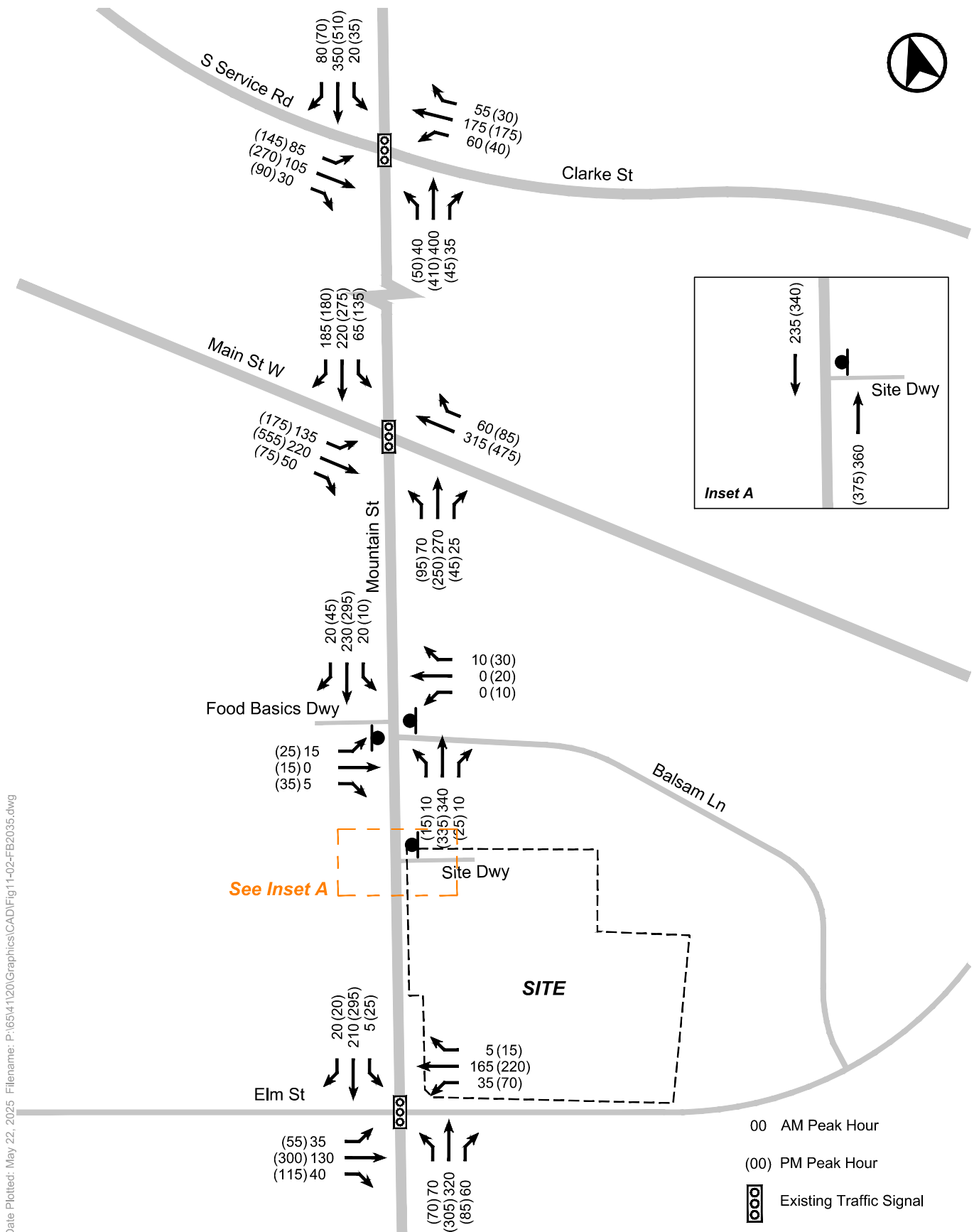


FIGURE 11 FUTURE BACKGROUND TRAFFIC VOLUMES - 2035 HORIZON

10.4 Site Traffic Volumes

10.4.1 Existing Site Traffic

The site is currently occupied by low-density commercial uses that do not generate substantial traffic during the weekday morning and afternoon peak hours. Fewer than five total two-way vehicle trips were observed at the existing site driveway when traffic counts were collected. As such, no vehicle trips have been removed from the existing network during the weekday peak hours as part of this analysis. This represents a conservative approach for analysis purposes.

10.4.2 Site Vehicle Trips

Table 20 summarizes the site vehicle trip generation for the development, based on the trip generation methodology outlined in **Section 9.3**. It should be noted that retail uses are considered ancillary and are anticipated to produce a negligible number of new vehicle trips.

Table 20 Site Vehicle Trips

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Residential Vehicle Trips	15	45	60	40	25	65
Retail Vehicle Trips	5	0	5	10	10	20
Total Site Vehicle Trips	20	45	65	50	35	85

10.4.3 Trip Distribution and Assignment

The residential and retail travel patterns for site generated traffic have been developed based on a review of the peak period peak direction traffic patterns derived from the 2022 TTS data set for the 2006 traffic zones 6008-6010 and 6014-6017. Detailed TTS queries are attached in **Appendix C**.

Table 21 summarizes the distribution of the inbound and outbound site traffic adopted for the analysis.



Table 21 Site Trip Distribution

Direction	Residential		Retail	
	Inbound	Outbound	Inbound	Outbound
North - Mountain Street	51%	46%	26%	27%
South – Mountain Street	13%	13%	21%	26%
East – Main Street	0%	4%	0%	8%
West – Main Street	17%	18%	14%	16%
East – Elm Street	4%	4%	15%	5%
West – Elm Street	7%	10%	12%	15%
East – Clarke Street	2%	2%	10%	2%
West – South Service Road	6%	3%	2%	1%
Total	100%	100%	100%	100%

Notes:

1. The inbound distribution is based on weekday afternoon peak hour, while the outbound distribution is based on weekday morning peak hour.
2. No traffic is assigned to approach from the east on Main Street, since westbound left-turn movements are restricted at Mountain Street / Main Street.

New site traffic has been assigned to the area street network based on the above distribution. Site traffic volumes are illustrated on **Figure 12**.

10.5 Future Total Traffic Volumes

Future total traffic volumes represent the sum of future background traffic volumes and new site traffic volumes. Future total traffic volumes for the 2030 and 2035 horizons are illustrated **Figure 13** and **Figure 14**, respectively.



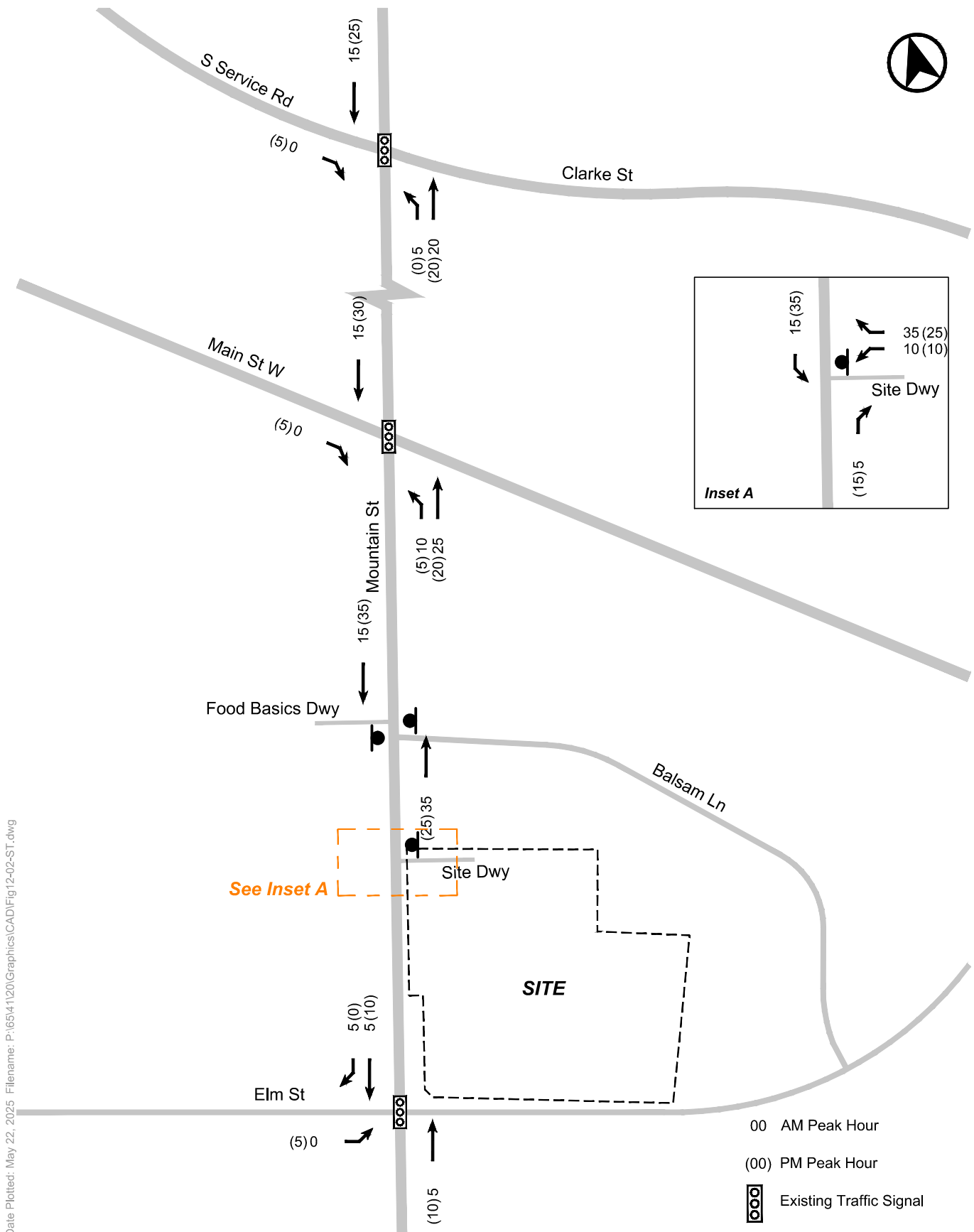


FIGURE 12 RESIDENTIAL SITE TRAFFIC VOLUMES

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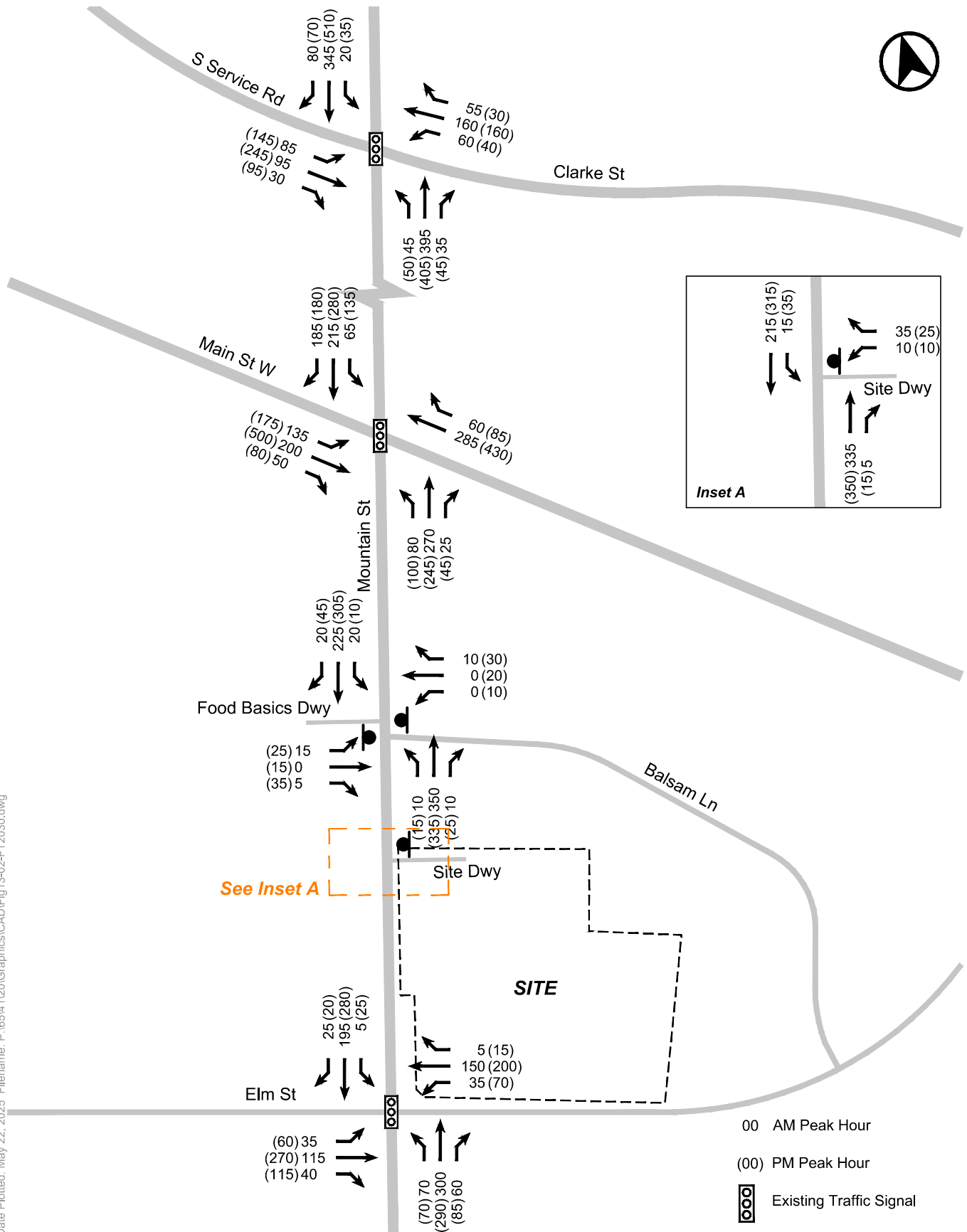


FIGURE 13 FUTURE TOTAL TRAFFIC VOLUMES - 2030 HORIZON

Date Plotted: May 22, 2025 Filename: P:\6541\20\Graphics\CAD\Fig14-02-FT2035.dwg

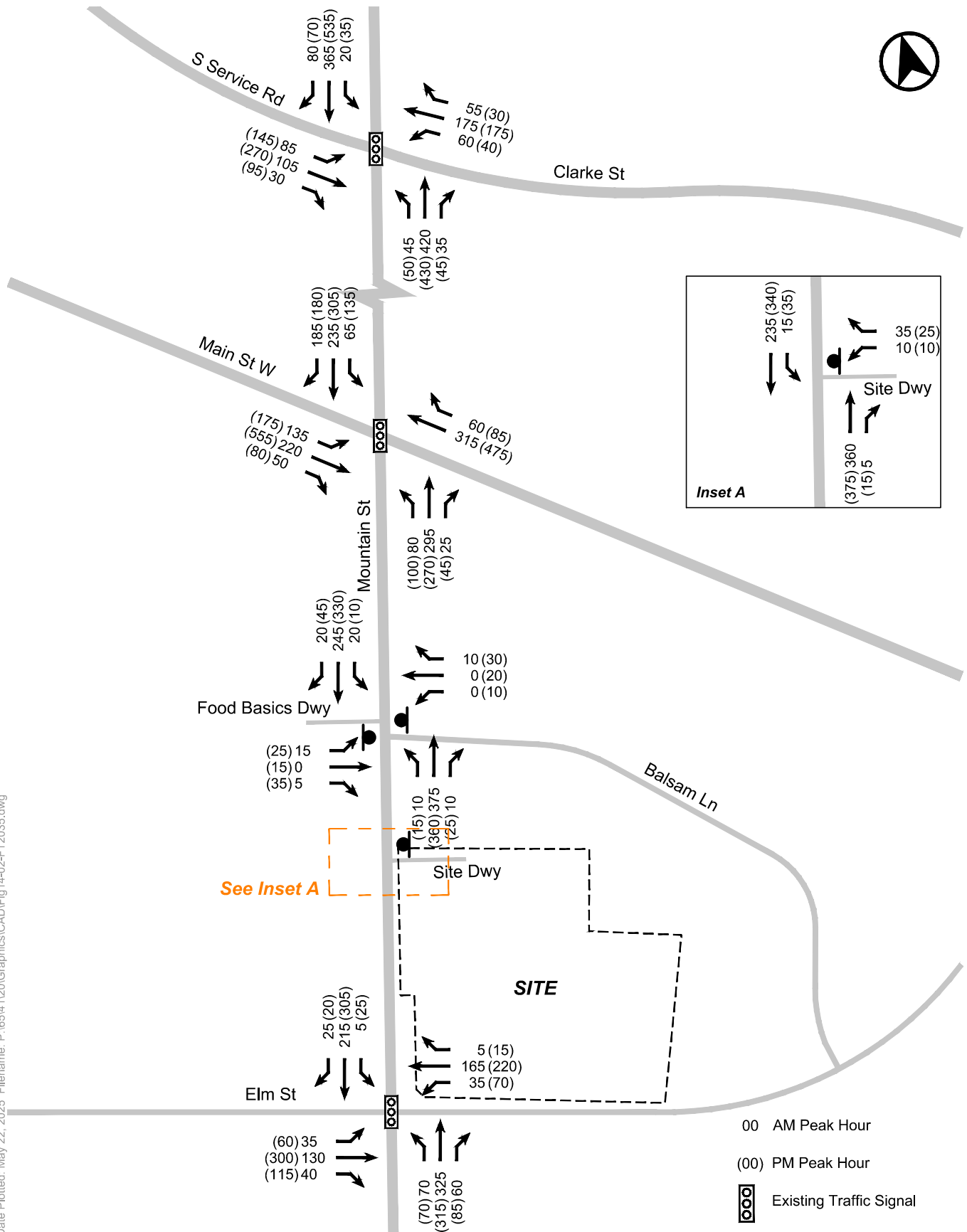


FIGURE 14 FUTURE TOTAL TRAFFIC VOLUMES - 2035 HORIZON

11.0 TRAFFIC OPERATIONS ANALYSIS

11.1 Analysis Methodology

Intersection capacity analysis has been completed using Synchro Version 11 and the Highway Capacity Manual (HCM) methodology.

For signalized intersections, the volume-to-capacity ratio (v/c) is an indicator of the capacity utilization for the key movements in the intersection. A v/c of 1.0 indicates that certain governing traffic movements through the intersection are operating at or near maximum capacity. The primary overall level of service (LOS) indicator is delay, both on individual movements and expressed as an average for all vehicles processed. Many busy urban intersections operate at LOS D to E, which reflect average (control) delays in the range of 35 to 80 seconds.

For unsignalized intersections, level of service (LOS) characterizes operational conditions for key movements in terms of delay within the traffic stream. LOS A represents a good level of service with short delays. LOS F represents a poor level of service with long delays. The volume to capacity ratio (v/c) is an indicator of the capacity utilization for key movements at the intersection and resultant residual capacity potential.

Based on Niagara Region guidelines, intersections expected to operate with movements with v/c greater than 0.85 and/or LOS E at signalized intersections and LOS D at unsignalized intersections are deemed critical.

11.2 Analysis Parameters

Existing signal timings, phasing plans, and cycle lengths were obtained from Niagara Region. These parameters were maintained for analysis of existing and future conditions. Existing signal timings plans are provided in **Appendix D**.

Heavy Vehicle Percentage

Heavy and medium truck percentages incorporated into the analysis were based upon information provided as part of intersection turning movement counts.

Ideal Saturation Flow Rate

The 2012 Niagara Region Guidelines for Transportation Impact Studies specify a base saturation flow rate of 1,750 passenger cars per hour of green time per lane (pcphgpl) for signalized and unsignalized intersections. The updated 2023 Niagara Region Guidelines provide specific saturation flow rates for all individual movements. A preliminary analysis which found that the intersection of **Christie Street – Mountain Street / Main Street** operates above its theoretical capacity under existing conditions when the 2023 saturation flow values were used. The 2023 saturation flow rates are therefore considered not to be appropriate for the study area intersections, and the 2012 values were used in the analysis, consistent with prior studies conducted for the subject site.

Lost Time Adjustment

The Niagara Region Guidelines for Transportation Impact Studies (2023) do not specify a lost time adjustment factor, but rather specify that a total lost time of 4 seconds be used where applicable. The default lost time adjustment of 0 seconds was assumed for all intersections in the analysis.

Peak Hour Factor

Peak Hour Factor (PHF) at intersections were derived from existing traffic counts.



Lane Utilization Factors

Under existing conditions, default Synchro lane utilization factors were adopted, which take into consideration the distribution of individual lane usage within each movement group.

11.3 Signalized Intersections

Christie Street – Mountain Street / Main Street

The intersection of **Christie Street - Mountain Street / Main Street** operates under actuated signal control with a maximum cycle length of 149.7 seconds during the morning and afternoon peak hour periods.

Table 22 summarizes analysis results for this intersection. Detailed analysis worksheets are provided in **Appendix F**.

Table 22 Christie Street - Mountain Street / Main Street – Capacity Analysis Summary

Movement	Existing		2030 Horizon				2035 Horizon			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.42 (0.62)	C (D)	0.55 (0.78)	D (D)	0.55 (0.78)	D (D)	0.60 (0.90)	D (E)	0.60 (0.90)	D (E)
EBTR	0.35 (0.70)	C (D)	0.41 (0.76)	C (D)	0.41 (0.77)	C (D)	0.44 (0.83)	C (D)	0.44 (0.84)	C (D)
WBTR	0.70 (0.91)	D (E)	0.72 (0.81)	D (D)	0.72 (0.81)	D (D)	0.78 (0.88)	D (E)	0.78 (0.88)	D (E)
NBL	0.35 (0.39)	C (D)	0.33 (0.45)	C (D)	0.40 (0.53)	C (D)	0.35 (0.49)	C (D)	0.43 (0.58)	C (D)
NBTR	0.57 (0.51)	D (D)	0.53 (0.51)	D (D)	0.58 (0.55)	D (D)	0.58 (0.56)	D (D)	0.63 (0.60)	D (D)
SBL	0.23 (0.38)	C (C)	0.22 (0.42)	C (D)	0.24 (0.44)	C (D)	0.24 (0.44)	C (D)	0.25 (0.47)	C (D)
SBTR	0.84 (0.82)	E (E)	0.75 (0.82)	D (E)	0.78 (0.88)	D (E)	0.79 (0.86)	D (E)	0.82 (0.93)	D (E)
Overall	0.68 (0.81)	D (D)	0.70 (0.79)	D (D)	0.72 (0.82)	D (D)	0.75 (0.88)	D (D)	0.77 (0.91)	D (D)

Notes:

1. xx (xx) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).

Under existing conditions, the intersection operates with overall v/c ratios of 0.68 and 0.81 during the weekday morning and afternoon peak hours, respectively.

Under future background conditions for the 2030 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.70 and 0.79 during the weekday morning and afternoon peak hours, respectively. Under future total conditions for the 2030 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.72 and 0.82 during the weekday morning and afternoon peak hours, respectively.



Under future background conditions for the 2035 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.75 and 0.88 during the weekday morning and afternoon peak hours, respectively. Under future total conditions for the 2035 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.77 and 0.91 during the weekday morning and afternoon peak hours, respectively.

Relative to future background conditions in 2030 and 2035, site traffic will have a minor impact on operations at this intersection.

Mountain Street / Elm Street

The intersection of **Mountain Street / Elm Street** operates under actuated signal control with a maximum cycle length of 70.4 seconds during the morning and afternoon peak hour periods.

Table 23 summarizes analysis results for this intersection. Detailed analysis worksheets are provided in **Appendix F**.

Table 23 Mountain Street / Elm Street – Capacity Analysis Summary

Movement	Existing		2030 Horizon				2035 Horizon			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.13 (0.15)	B (B)	0.13 (0.15)	B (B)	0.13 (0.17)	B (B)	0.13 (0.16)	B (B)	0.13 (0.18)	B (B)
EBTR	0.29 (0.59)	B (C)	0.31 (0.64)	B (C)	0.31 (0.64)	B (C)	0.34 (0.69)	B (C)	0.34 (0.69)	B (C)
WBL	0.12 (0.27)	B (B)	0.12 (0.29)	B (B)	0.12 (0.29)	B (B)	0.12 (0.32)	B (C)	0.12 (0.32)	B (C)
WBTR	0.28 (0.32)	B (B)	0.31 (0.35)	B (B)	0.31 (0.35)	B (B)	0.34 (0.38)	B (B)	0.34 (0.38)	B (B)
NBTLR	0.73 (0.61)	C (B)	0.77 (0.64)	C (B)	0.78 (0.66)	C (B)	0.82 (0.68)	C (C)	0.83 (0.70)	C (C)
SBTLR	0.32 (0.40)	B (B)	0.35 (0.43)	B (B)	0.37 (0.45)	B (B)	0.39 (0.47)	B (B)	0.40 (0.48)	B (B)
Overall	0.54 (0.60)	B (B)	0.57 (0.64)	B (B)	0.58 (0.65)	B (B)	0.61 (0.68)	C (C)	0.62 (0.69)	C (C)

Notes:

1. xx (xx) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).

Under existing conditions, the intersection operates with overall v/c ratios of 0.54 and 0.60 during the weekday morning and afternoon peak hours, respectively.

Under future background conditions for the 2030 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.57 and 0.64 during the weekday morning and afternoon peak hours, respectively. Under future total conditions for the 2030 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.58 and 0.65 during the weekday morning and afternoon peak hours, respectively.



Under future background conditions for the 2035 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.61 and 0.68 during the weekday morning and afternoon peak hours, respectively. Under future total conditions for the 2035 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.62 and 0.69 during the weekday morning and afternoon peak hours, respectively.

Relative to future background conditions in 2030 and 2035, site traffic will have a minimal impact on operations at this intersection.

Christie Street / South Service Road – Clarke Street

The intersection of **Christie Street / South Service Road – Clarke Street** operates under actuated signal control with a maximum cycle length of 64 seconds during the morning and afternoon peak hour periods.

Table 23 summarizes analysis results for this intersection. Detailed analysis worksheets are provided in **Appendix F**.

Table 24 Christie Street / South Service Road – Clarke Street – Capacity Analysis Summary

Movement	Existing		2030 Horizon				2035 Horizon			
			Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBTLR	0.48 (0.83)	B (C)	0.50 (0.78)	B (C)	0.50 (0.79)	B (C)	0.53 (0.82)	B (C)	0.53 (0.83)	B (C)
WBTLR	0.53 (0.37)	B (B)	0.56 (0.36)	B (B)	0.56 (0.36)	B (B)	0.59 (0.38)	B (B)	0.59 (0.38)	B (B)
NBL	0.16 (0.18)	B (B)	0.16 (0.22)	B (B)	0.19 (0.23)	B (B)	0.17 (0.23)	B (B)	0.19 (0.24)	B (B)
NBTR	0.37 (0.33)	B (B)	0.40 (0.40)	B (B)	0.42 (0.42)	B (B)	0.42 (0.43)	B (B)	0.44 (0.44)	B (B)
SBL	0.07 (0.10)	B (B)	0.08 (0.12)	B (B)	0.08 (0.12)	B (B)	0.08 (0.13)	B (B)	0.08 (0.13)	B (B)
SBTR	0.35 (0.43)	B (B)	0.37 (0.51)	B (B)	0.39 (0.54)	B (B)	0.40 (0.54)	B (B)	0.41 (0.56)	B (B)
Overall	0.45 (0.63)	B (B)	0.48 (0.66)	B (B)	0.49 (0.68)	B (B)	0.50 (0.70)	B (C)	0.51 (0.71)	B (C)

Notes:

1. xx (xx) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour).

Under existing conditions, the intersection operates with overall v/c ratios of 0.45 and 0.63 during the weekday morning and afternoon peak hours, respectively.

Under future background conditions for the 2030 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.48 and 0.66 during the weekday morning and afternoon peak hours, respectively. Under future total conditions for the 2030 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.49 and 0.68 during the weekday morning and afternoon peak hours, respectively.



Under future background conditions for the 2035 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.50 and 0.70 during the weekday morning and afternoon peak hours, respectively. Under future total conditions for the 2035 horizon, the intersection is forecasted to operate with overall v/c ratios of 0.51 and 0.71 during the weekday morning and afternoon peak hours, respectively.

Relative to future background conditions in 2030 and 2035, site traffic will have a minimal impact on operations at this intersection.

11.4 Unsignalized Intersections

Table 25 summarizes analysis results for unsignalized intersections in the study area. Detailed analysis worksheets are provided in **Appendix F**.

Under future total conditions, all movements at these intersections operate at LOS C or better during the weekday morning and afternoon peak hours.

Table 25 Unsignalized Intersections – Capacity Analysis Summary

Movement	Existing		2030 Horizon				2035 Horizon			
			Future Background		Future Total		Future Background		Future Total	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Mountain Street / Shopping Centre Access – Balsam Lane										
EBTLR	B (B)	14.7 (14.6)	C (C)	15.3 (15.2)	C (C)	16.4 (16.4)	C (C)	16.1 (16.1)	C (C)	17.4 (17.4)
WBTLR	B (B)	10.4 (13.8)	B (B)	10.3 (14.2)	B (C)	10.8 (15.1)	B (B)	10.4 (14.8)	B (C)	10.7 (15.8)
NBTLR	A (A)	0.3 (0.5)	A (A)	0.3 (0.4)	A (A)	0.3 (0.4)	A (A)	0.3 (0.4)	A (A)	0.3 (0.4)
SBTLR	A (A)	0.9 (0.3)	A (A)	0.8 (0.3)	A (A)	0.8 (0.3)	A (A)	0.8 (0.3)	A (A)	0.8 (0.3)
Mountain Street / Site Access										
WBLR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	B (B)	11.2 (11.9)	A (A)	0.0 (0.0)	B (B)	11.3 (12.3)
NBTR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
SBTL	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.6 (1.1)	A (A)	0.0 (0.0)	A (A)	0.6 (1.1)

Notes:

1. xx (xx) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)



12.0 SUMMARY AND CONCLUSIONS

The following provides a summary overview of the study findings of our assessment of the transportation related aspects of the proposed development.

Transportation Context

1. The site consists of properties known as 13 Mountain Street and 19-23 Elm Street. The site is bounded by Mountain Street to the west, a funeral home to the north, a municipal surface parking lot to the east, and Elm Street to the south.
2. The site is currently occupied by three buildings/structures comprised of residential uses and commercial uses. Two surface parking lots are provided on the site today to service the site today with vehicular access from three driveways (two driveways from Mountain Street and one access from Elm Street).
3. The site is located within the downtown intensification area of the Town of Grimsby.

Development Proposal

4. The proposed development is comprised of a mixed-use development, which includes 177 purpose-built rental units, 391 m² of community hub uses and 279 m² of retail uses. Access to the site is proposed via one driveway on Mountain Street.
5. The current proposal includes the provision of 150 parking spaces located within a three-level parking garage, one (1) loading space, and 56 bicycle parking spaces.

Vehicular Parking

6. The site is currently subject to multiple Zoning By-law parking requirements. 13 Mountain Street and 19-21 Elm Street is currently subject to the site-specific requirements of Town of Grimsby Zoning By-law 14-45 Exception 377 (OLT 24-001). 23 Elm Street is currently subject to the Town of Grimsby Zoning By-law 14-45 parking requirements.
7. Application of the applicable of Town of Grimsby Zoning By-law 14-45 Exception 377 parking standard to the entire site, requires the provision of 232 parking spaces including 177 residential spaces, 45 residential visitor spaces and 10 retail spaces.
8. Application of Town of Grimsby Zoning By-law 14-45 parking standard to the entire site would require a total of 277 parking spaces including 222 residential spaces, 45 residential visitor spaces and 10 retail spaces.
9. Three (3) surface parking spots in the adjacent municipal parking off of Balsam Lane are also owned by Owners of 13 Mountain Street, 19 Elm Street and 21 Elm Street.
10. Town of Grimsby Zoning By-law 14-45 Exception 377 (OLT-22-003541) permits the use of cash-in-lieu for up to a maximum of 15 spaces for any deficiency from the parking requirement.
11. A total of 150 parking spaces are provided on-site, which includes 121 resident spaces, 45 commercial parking spaces (including 27 on-site parking spaces and 18 off-site parking spaces), and 2 car share parking spaces.
12. An effective residential parking supply ratio of 0.728 spaces per unit is proposed, taking into account the proposed car-share provisions. Of the overall effective residential parking rate of 0.728 spaces per unit, 0.83 spaces per unit is provided for the market rental units and 0 spaces per unit is provided for the affordable rental units.



13. The proposed development includes a total of 6 accessible parking spaces, including 3 Type A and 3 Type B spaces.
14. A reduction in residential parking supply is considered acceptable from a policy perspective, given the following:
 - the site's location to the downtown area of Grimsby and intensification areas;
 - relevant policies outlined in the Grimsby Official Plan, which encourage reduced parking requirements for redevelopment proposals in proximity to public parking facilities;
 - the site's specific characteristics (rental and affordable nature) of the development which support a reduced parking supply;
 - the extent of recent planning policies which are supportive of a reduced residential parking supply, such as the City of St. Catherine Zoning By-law Amendment 2025-003, which eliminates parking requirements for all affordable residential units; and
 - the proposed TDM plan for the site which supports alternate modes of travel such as transit and active transportation.
15. The proposed commercial parking supply shared between residential visitors and retail uses is considered appropriate, given the following:
 - the site's location to the downtown area of Grimsby and intensification areas;
 - the review of other parking standards within the GTHA suggesting that a reflected residential visitor parking ratio of 0.20 space per unit is appropriate;
 - reduced residential visitor parking supply standards approved in the Town of Grimsby as low as 0.10 spaces per unit;
 - the review of the area public parking facilities suggesting there is available parking in the area; and
 - the review of the time-of-day sharing provisions, demonstrating that there is additional parking availability within the evening time periods for residential visitors to use as retail demand diminishes.
16. From a policy perspective, the proposed parking plan aligns with local and regional policies promoting sustainable urban growth and a reduced reliance on personal vehicles. The combination of robust TDM measures, site context, and alignment with regional and locally policy objectives demonstrate that a reduced parking supply is supportable within the Downtown Intensification area of Grimsby.

Loading

17. One (1) loading space with dimensions 3.5m in width, 9m in length, and a height clearance of 6.1m is proposed per the requirements outlined in the Town of Grimsby Zoning By-law 14-45.
18. It is proposed that refuse collection is to be serviced by a private contractor.

Bicycle Parking

19. The Town of Grimsby Zoning By-law 14-45 requires a total of 55 bicycle parking spaces, 54 spaces for residential tenant and visitor use and one (1) space for non-residential uses.
20. The proposed development includes a provision for 56 bicycle parking spaces consisting of 54 spaces for residential tenant and visitor use and 2 spaces for non-residential uses.



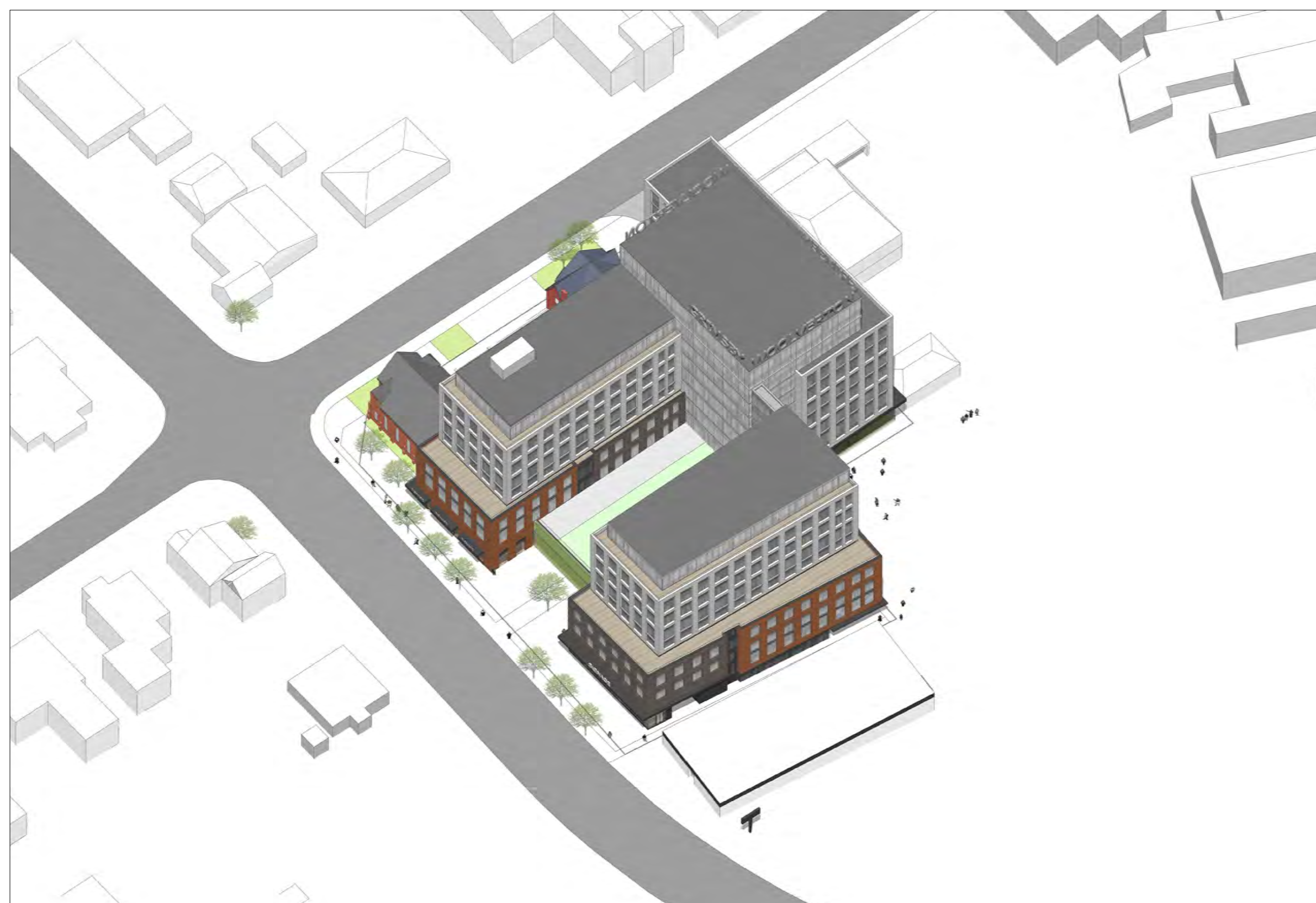
Traffic Volumes and Operations

21. BA Group has conducted a review of the traffic-related impacts of the proposed development.
22. Existing weekday morning and afternoon peak hour traffic activity levels were established for the study area based upon traffic count information collected by Niagara Region.
23. Traffic growth allowances have been made within the future traffic volume projections to account for an overall two percent yearly growth rate on all roads, as per the Region's TIS guidelines.
24. The proposed development is forecasted to generate 60 and 65 two-way residential trips during the weekday morning and afternoon peak hours, respectively.
25. The proposed development is forecasted to generate 5 and 20 two-way retail trips during the weekday morning and afternoon peak hours, respectively.
26. Traffic operations at the area intersections within the study area are acceptable today and will remain acceptable in the future with redevelopment of the site as planned.
27. Site related impacts on traffic operations are minor in comparison to future background traffic conditions. Site-related volume changes can, as such and based on the above, be acceptably and appropriately accommodated at the area intersections and proposed site driveway.



Appendix A: Reduced Scale Architectural Plans





Issued

Issued for OPA/ZBA1 May 16, 2025

Description: _____ Date: _____

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Architects:

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MULTI-UNIT RESIDENTIAL
DEVELOPMENT

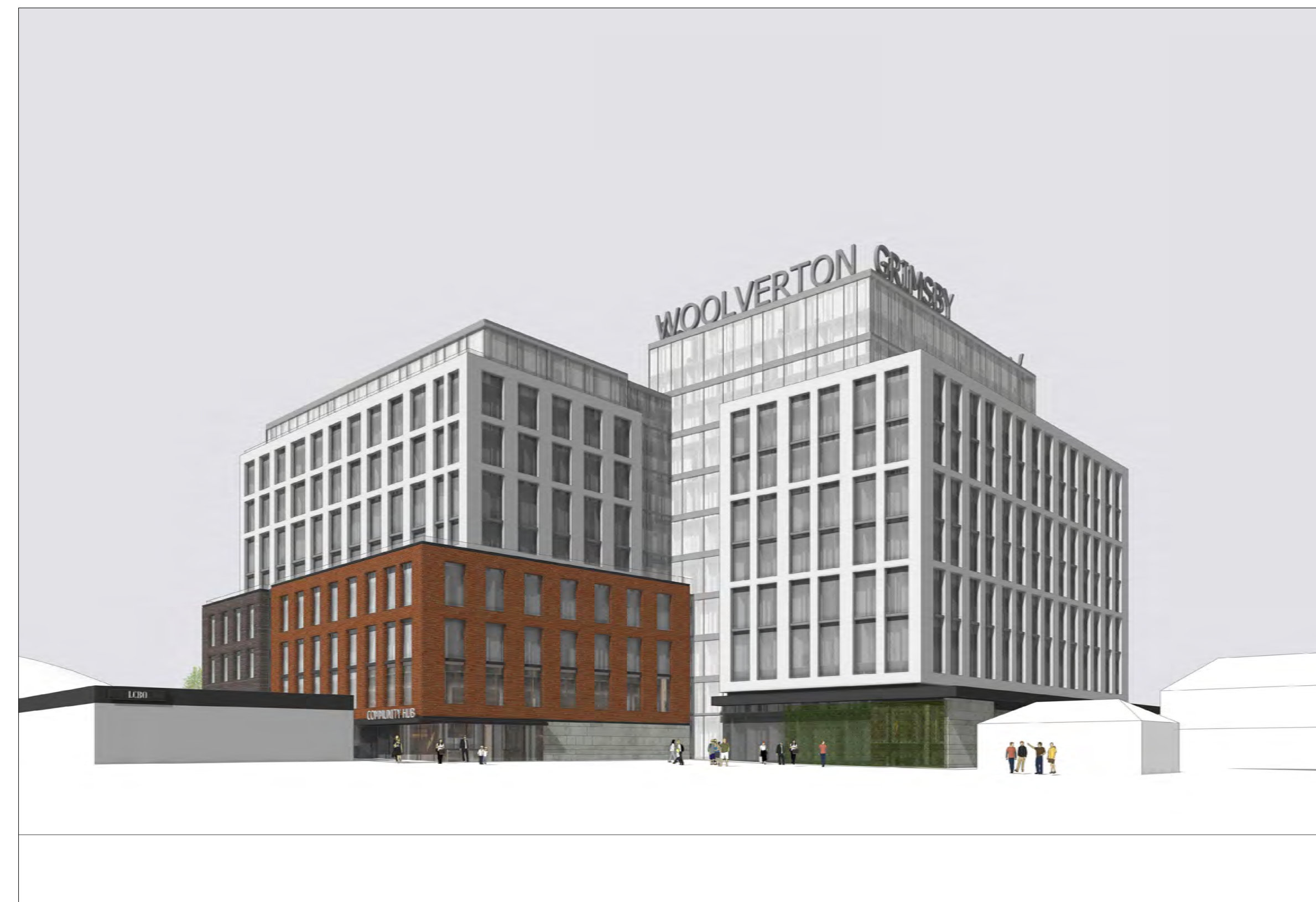
13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

AERIAL VIEWS

Project No.: 2416
Scale: NTS
Date: May 16, 2025
Drawn by:

Drawing No.:

A0.00A



Issued

Issued for OPA/ZBA1	May 16, 2025
Description:	Date:

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MULTI-UNIT RESIDENTIAL
DEVELOPMENT

13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

PERSPECTIVE VIEWS

Project No.: 2416
Scale: NTS
Date: May 16, 2025
Drawn by:

Drawing No.:

A0.00B

PROPOSED MULTI-UNIT RESIDENTIAL DEVELOPMENT

13 Mountain Street & 19-23 Elm Street, Grimsby, ON

01. SITE AREA	(m²)
LOT AREA (existing)	4,710.0
LOT AREA (after road widening):	4,513.5
ROAD WIDENING AREA	196.5
MAXIMUM BUILDING FOOTPRINT (Including heritage)	2,798.8
LOT COVERAGE %	62%
HERITAGE BUILDING (6% OF SITE AREA)	273.7
-EXISTING WOOLVERTON HOUSE AREA	117.5
-EXISTINGWOOLVERTON HALL AREA	156.2

02. FLOOR AREA SUMMARY	(m²)
TOTAL GCA (including Parking below grade)	22,801.2
TOTAL GCA (excluding Parking below grade)	19,608.7
NEW RESIDENTIAL GFA	12,472.0
NEW NON-RESIDENTIAL GFA (At Grade Commercial)	279.1
TOTAL GFA	12,751.1
COMMUNITY HUB (not includes in GFA)	449.5
NUMBER OF STORIES	8

03. F.S.I	PROPOSED
FSI IS CALCULATED BASED ON THE TOTAL GROSS FLOOR AREA AS A PERCENTAGE OF THE LOT AREA (After road widening)	2.83

04. RESIDENTIAL UNITS	PROPOSED
TOTAL	177

05. CAR PARKING	PROPOSED
STANDARD PARKING	134
SMALL CAR PARKING	8
ACCESSIBLE PARKING	6
CAR-SHARE	2
TOTAL	150

06. BIKE PARKING	PROPOSED
RESIDENTIAL	54
RETAIL	2
TOTAL	56

07. ESTABLISHED GRADE	PROPOSED
AS PER BY-LAW	94.45 m

08. BUILDING HEIGHT	PROPOSED
BUILDING HEIGHT	29.85 m
BUILDING HEIGHT (including mech)	34.00 m

BUILDING HEIGHT DETERMINED AS FOLLOWS:

Height measured from average finished grade of the front wall of the building along Mountain Street and Elm street to the top 8th floor.

GROSS FLOOR AREA (Grimsby Zoning By-law No. 14-45,2019)

GFA calculation based on definition per grimsby zoning by-law No. 14-45, 2019. Residential GFA includes only interior residential unit area, measured between the exterior faces of exterior walls or from the centre line of a common or party wall, excluding any cellar, basement, parking lot or mechanical room. GFA exludes amenity spaces, community hubs, corridors and vertical and horizontal circulation, above and below grade parking and all other common areas.

AREA STATISTICS

LEVEL	TOTAL GCA		RESIDENTIAL AREA		COMMERCIAL/ RETAIL		COMMUNITY HUB		LOCKERS		VEHICLE PARKING		INDOOR AMENITY		OUTDOOR AMENITY		GFA EXCLUSION		TOTAL GFA	
	m²	sf	m²	sf	m²	sf	m²	sf	m²	sf	m²	sf	m²	sf	m²	sf	m²	sf	m²	sf
P1	3,192.5	34,363.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,729.6	29,381.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GROUND FLOOR	2,720.6	29,284.6	0.0	0.0	279.1	3,004.4	250.5	2,696.0	0.0	0.0	1,409.7	15,174.2	173.4	1,866.2	0.0	0.0	2,441.5	26,280.2	279.1	3,004.4
INTERMEDIATE FLOOR	1,662.5	17,894.9	0.0	0.0	0.0	0.0	199.1	2,142.8	0.0	0.0	1,333.8	14,356.8	0.0	0.0	190.0	2,045.1	1,662.5	17,894.9	0.0	0.0
FLOOR 2	2,557.8	27,531.4	2,168.8	23,344.8	0.0	0.0	0.0	0.0	113.6	1,222.3	0.0	0.0	0.0	0.0	0.0	0.0	389.0	4,186.6	2,168.8	23,344.8
FLOOR 3	2,423.2	26,082.8	2,133.6	22,965.9	0.0	0.0	0.0	0.0	37.5	403.8	0.0	0.0	0.0	0.0	0.0	0.0	289.6	3,116.9	2,133.6	22,965.9
FLOOR 4	2,035.5	21,910.4	1,744.3	18,775.4	0.0	0.0	0.0	0.0	37.5	403.8	0.0	0.0	0.0	0.0	0.0	0.0	291.3	3,135.0	1,744.3	18,775.4
FLOOR 5	2,035.5	21,910.4	1,744.3	18,775.4	0.0	0.0	0.0	0.0	37.5	403.8	0.0	0.0	0.0	0.0	0.0	0.0	291.3	3,135.0	1,744.3	18,775.4
FLOOR 6	2,035.5	21,910.4	1,744.3	18,775.4	0.0	0.0	0.0	0.0	37.5	403.8	0.0	0.0	0.0	0.0	0.0	0.0	291.3	3,135.0	1,744.3	18,775.4
FLOOR 7	2,035.5	21,910.4	1,744.3	18,775.4	0.0	0.0	0.0	0.0	37.5	403.8	0.0	0.0	0.0	0.0	0.0	0.0	291.3	3,135.0	1,744.3	18,775.4
FLOOR 8	1,468.5	15,806.7	1,192.4	12,834.9	0.0	0.0	0.0	0.0	37.5	403.8	0.0	0.0	0.0	0.0	0.0	0.0	276.1	2,971.8	1,192.4	12,834.9
MPH	634.0	6,824.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	634.0	6,824.5	0.0	0.0
TOTAL	22,801.2	238,605.6	12,472.0	134,247.1	279.1	3,004.4	449.5	4,838.8	338.6	3,644.9	5,473.1	58,912.2	173.4	1,866.2	190.0	2,045.1	6,857.6	66,990.4	12,751.1	137,251.5

ABOVE GROUND GCA 19,608.7 211,066.4

VEHICULAR PARKING

REQUIRED VEHICULAR PARKING - Site Specific ZBL (OLT-24-001)			
USE	UNITS/GFA	MINIMUM PARKING RATE	MINIMUM REQUIRED
RESIDENTIAL DWEILLING UNIT	177 units	1.00	177
RESIDENTIAL SUB-TOTAL			177
NON-RESIDENTIAL			
-RESIDENTIAL VISITOR	177 units	0.25	45
-RETAIL USE	279 sqm	1/28sqm	10
NON-RESIDENTIAL SUB-TOTAL			55
TOTAL PARKING REQUIREMENT			232

ACCESSIBLE PARKING REQUIREMENT	2 SPACES + 2% of supply	7
--------------------------------	-------------------------	---

Note: Vehcular parking calculations resulting in a fraction have been rounded up to the nearest whole number in accordance with the requirements oulined in Section 5.2 of the Town of Grimsby Zone By-law 14-45

PROPOSED VEHICULAR PARKING														
LEVEL	COMMERCIAL PARKING					RESIDENTIAL PARKING				TOTAL PARKING SUPPLY				
	STANDARD	ACCESSIBLE	SMALL CAR	CAR-SHARE	TOTAL	STANDARD	ACCESSIBLE	SMALL CAR	TOTAL	STANDARD	ACCESSIBLE	SMALL CAR	CAR-SHARE	TOTAL
P1	25	2	0	2	29	42	0	1	43	67	2	1	2	72
GROUND	0	0	0	0	0	35	2	3	40	35	2	3	0	40
INTERMEDIATE	0	0	0	0	0	32	2	4	38	32	2	4	0	38
TOTAL	25	2	0	2	29	109	4	8	121	134	6	8	2	150

* Tandem parking spaces are not included in parking space calculations noted above. 6 Tandem parking spaces provided.

* Tandem parking spaces are not included in parking space calculations noted above. 6 Tandem parking spaces provided.

BICYCLE PARKING

BICYCLE PARKING STATISTICS				
REQUIREMENT (BY-LAW No. 14-45)				SPACES PROPOSED
USE	UNITS/SPACES	BIKE RATE	SPACES REQUIRED	
RESIDENTIAL	177 units	0.3	54	54
RETAIL	10 spaces	7% of supply	1	2
TOTAL BICYCLE PARKING			55	56

LOADING AND WASTE

PROPOSED LOADING AND WASTE	
UNITS COUNT	177
LOADING SPACE REQUIREMENT	Loading Space (3.5 x 9.0 m)
STAGING AREA	17.8 m²
WASTE STORAGE ROOM	65.64 m²

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Architects:

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MULTI-UNIT RESIDENTIAL DEVELOPMENT

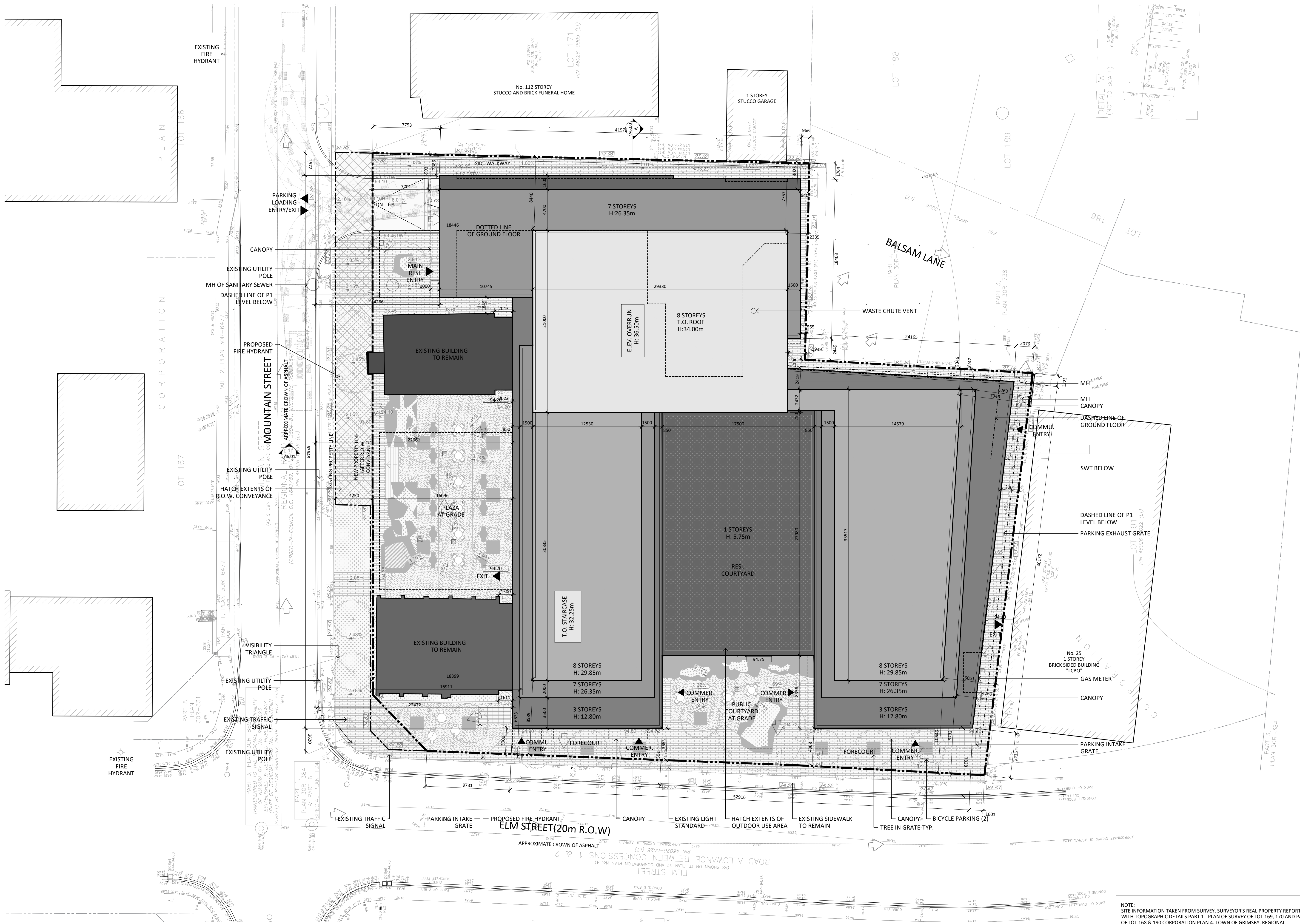
13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

PROJECT STATISTICS

Project No.: 2416
Scale: NTS
Date: May 16, 2025
Drawn by:

Drawing No.:

A0.01



NOTE:
SITE INFORMATION TAKEN FROM SURVEY, SURVEYOR'S REAL PROPERTY REPORT
WITH TOPOGRAPHIC DETAILS PART 1 - PLAN OF SURVEY OF LOT 168, 170 AND PART
OF LOT 166 & 190 CORPORATION PLAN 4, TOWN OF GRIMSBY, REGIONAL
MUNICIPALITY OF NIAGARA.
DRAWING BY J.D.BARNES LIMITED, DATED JUNE 19, 2024.



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Architects:

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www.studiojci.com

**MULTI-UNIT RESIDENTIAL
DEVELOPMENT**

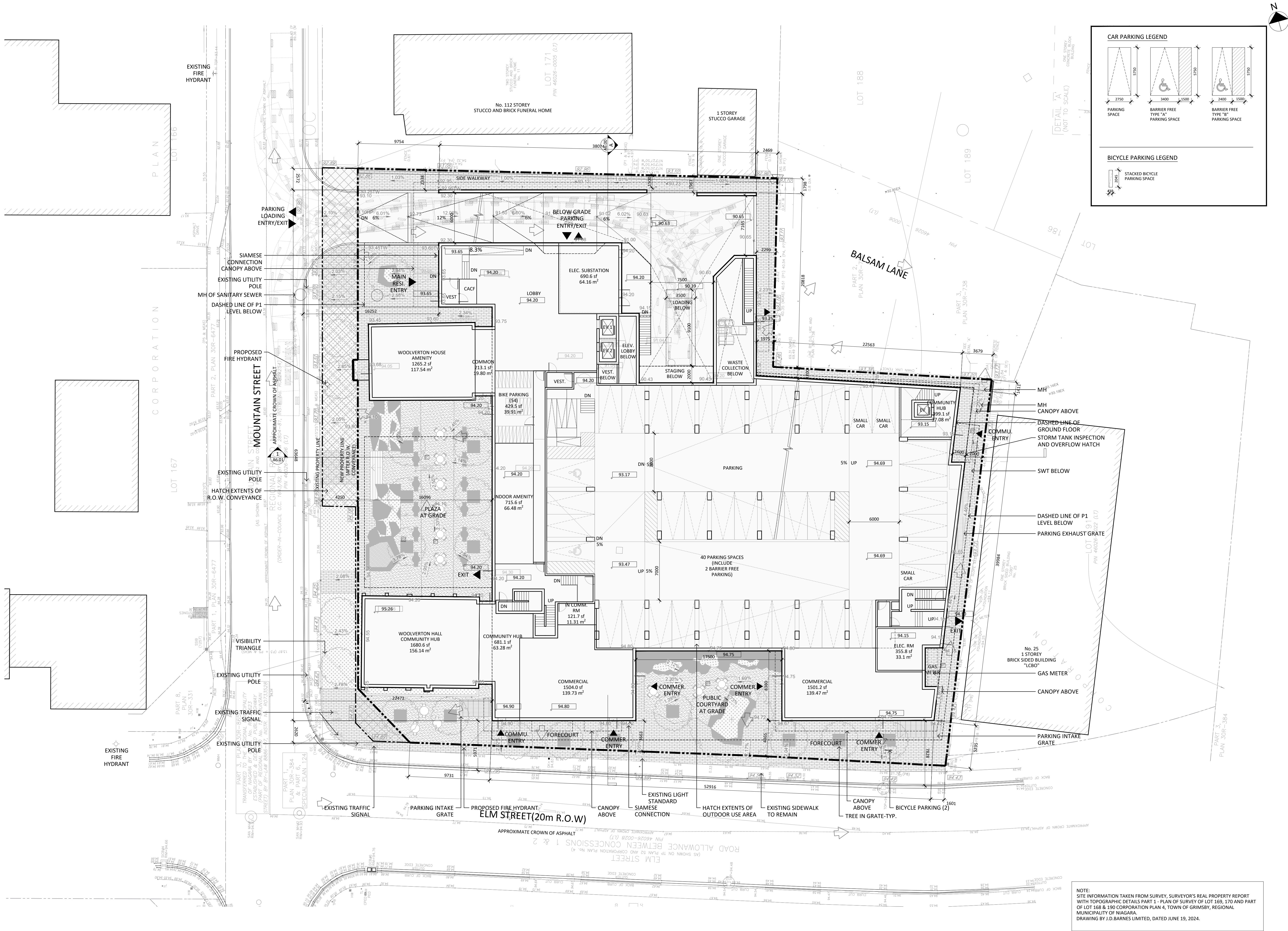
13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

SITE PLAN

Project No.: 2416
Scale: 1:200
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A1.01



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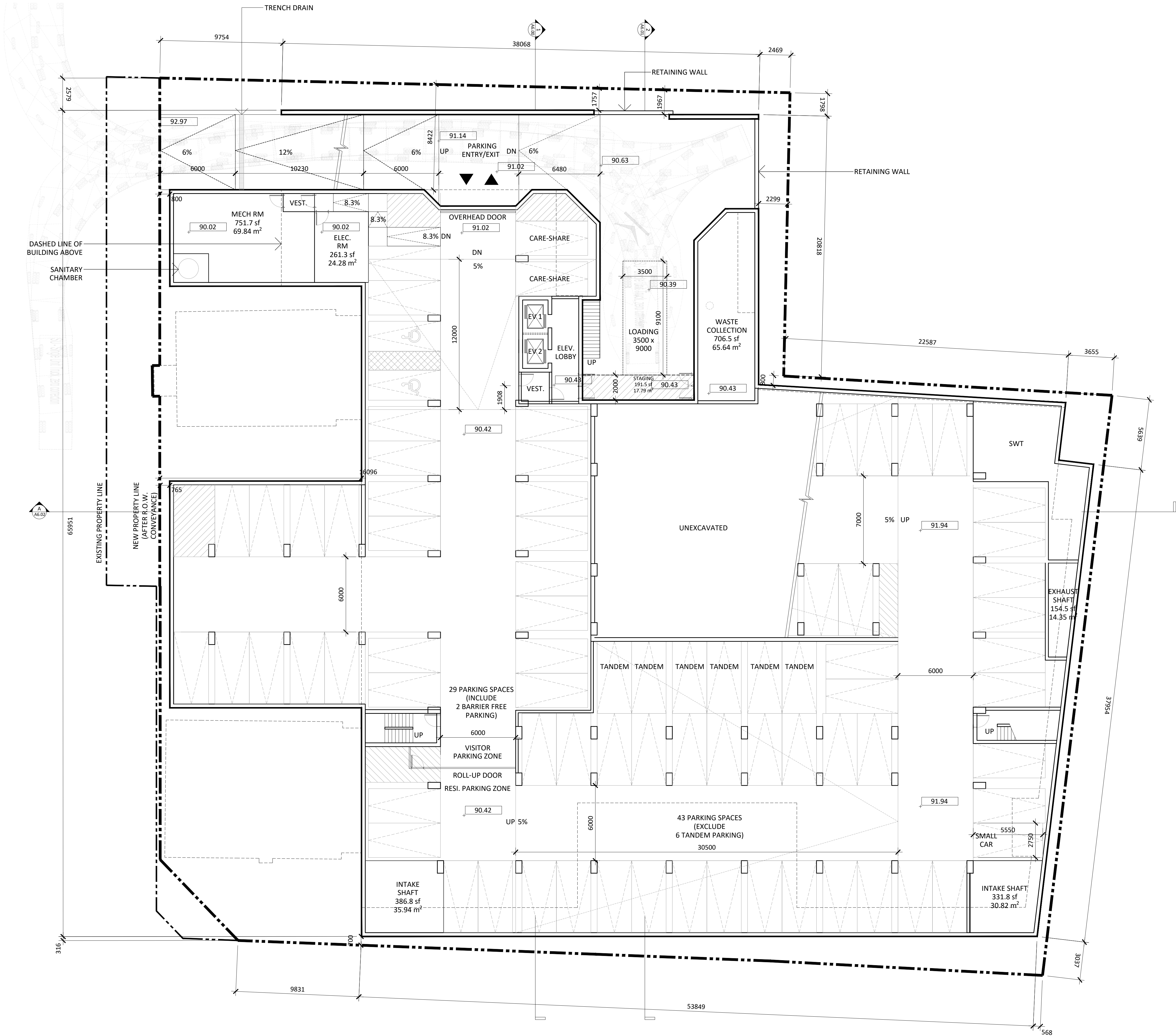
13 Mountain Street & 19 - 23 Elm Street
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GROUND FLOOR SITE PLAN

Project No.: 2416
Scale: 1:200
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A1.01



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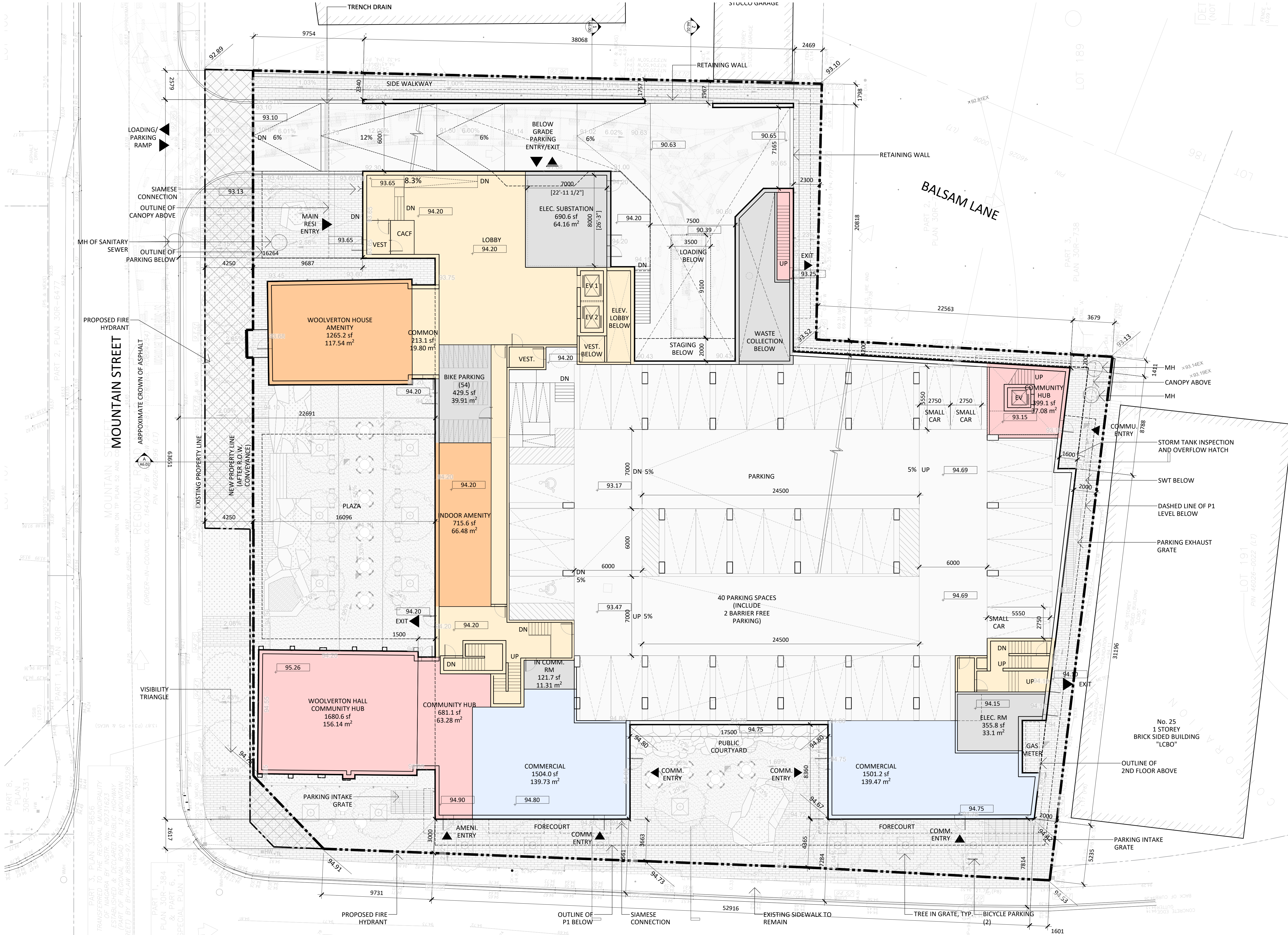
13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

P1 FLOOR PLAN

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A3.0Z



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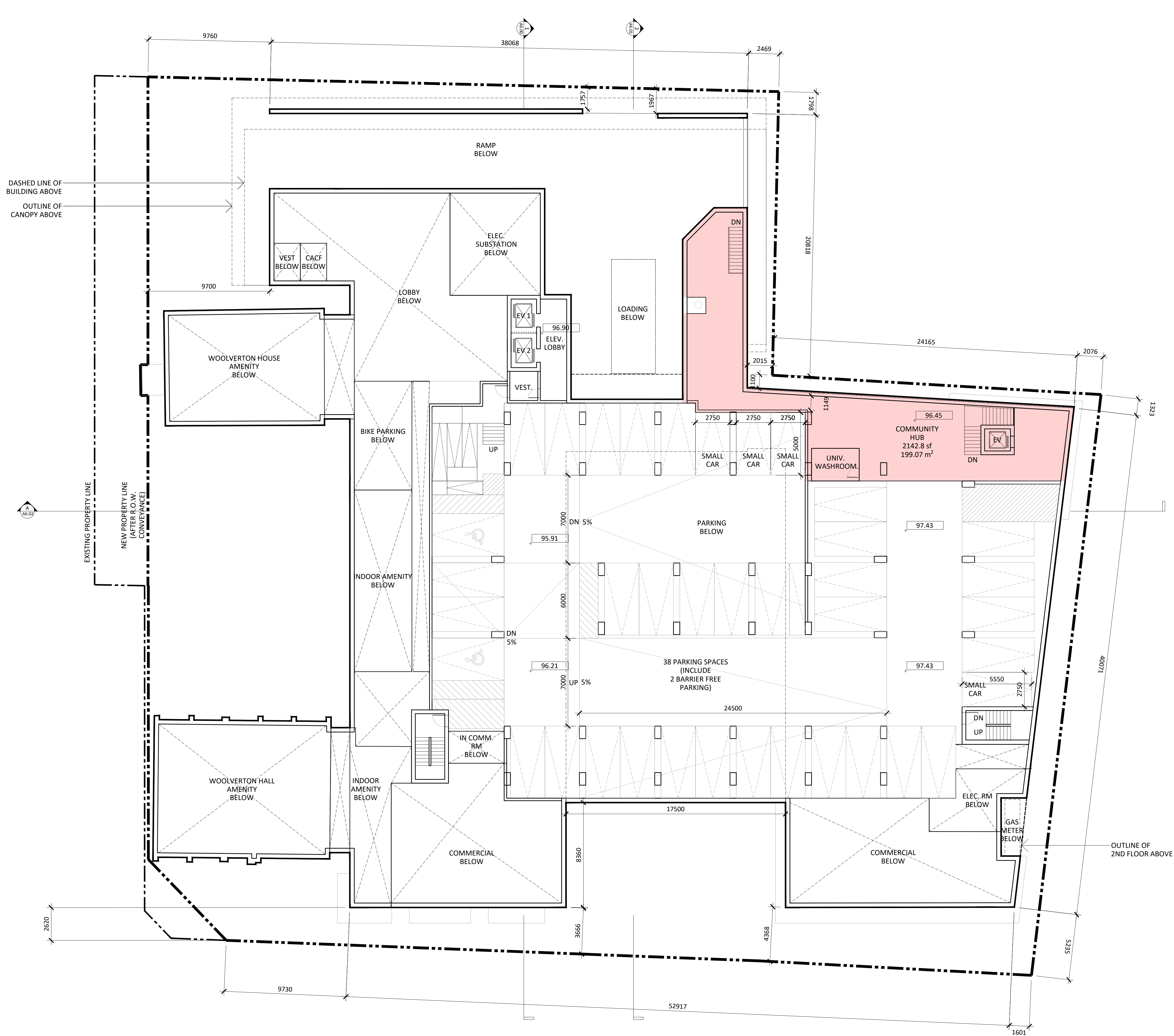
13 Mountain Street & 19 - 23 Elm Street
Grimbsy, ON L3M 3J7

GROUND FLOOR PLAN

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A3.00



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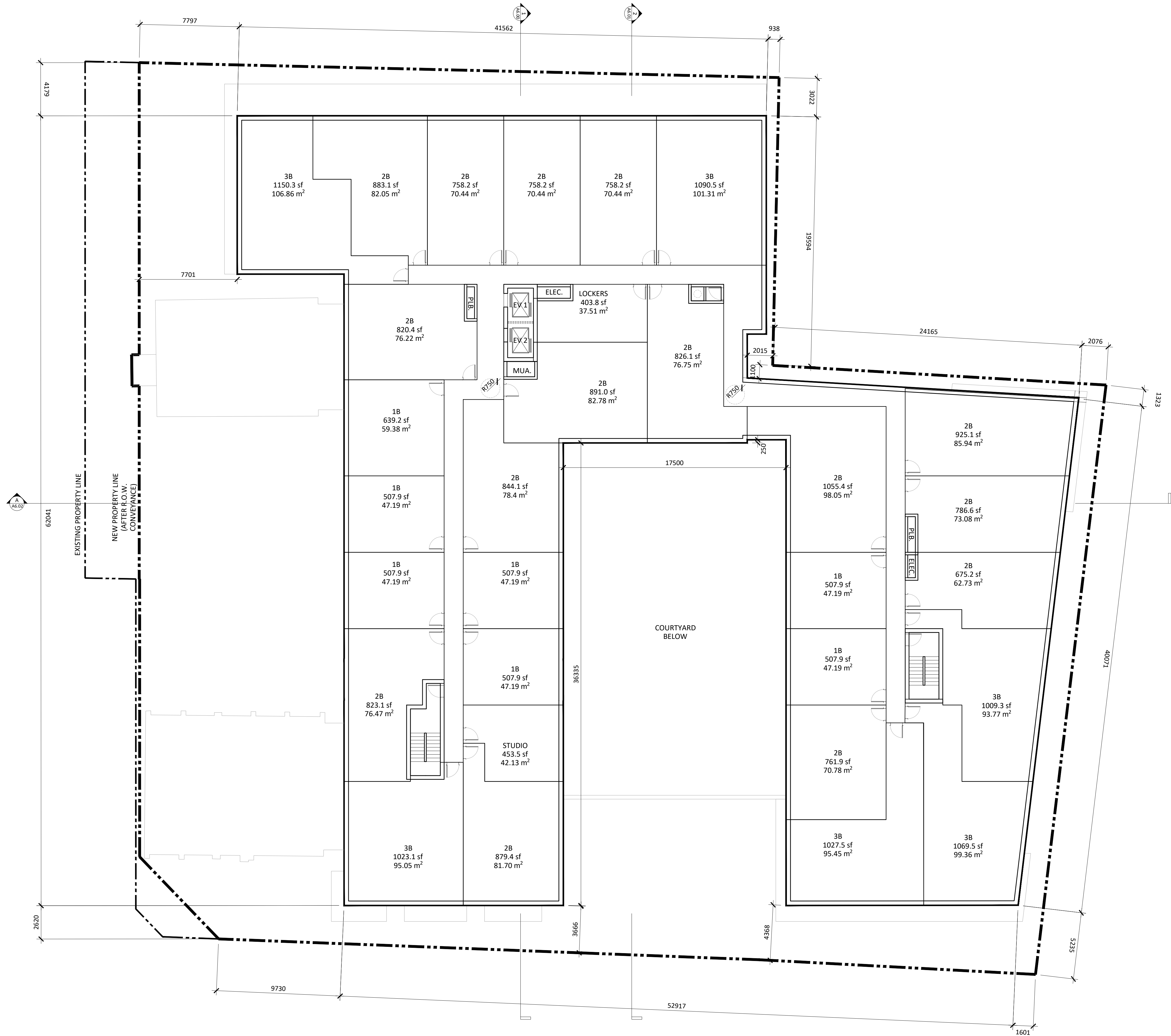
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Project No.: 2416
Scale: 1:150
Date: May 16, 2025
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A3.02



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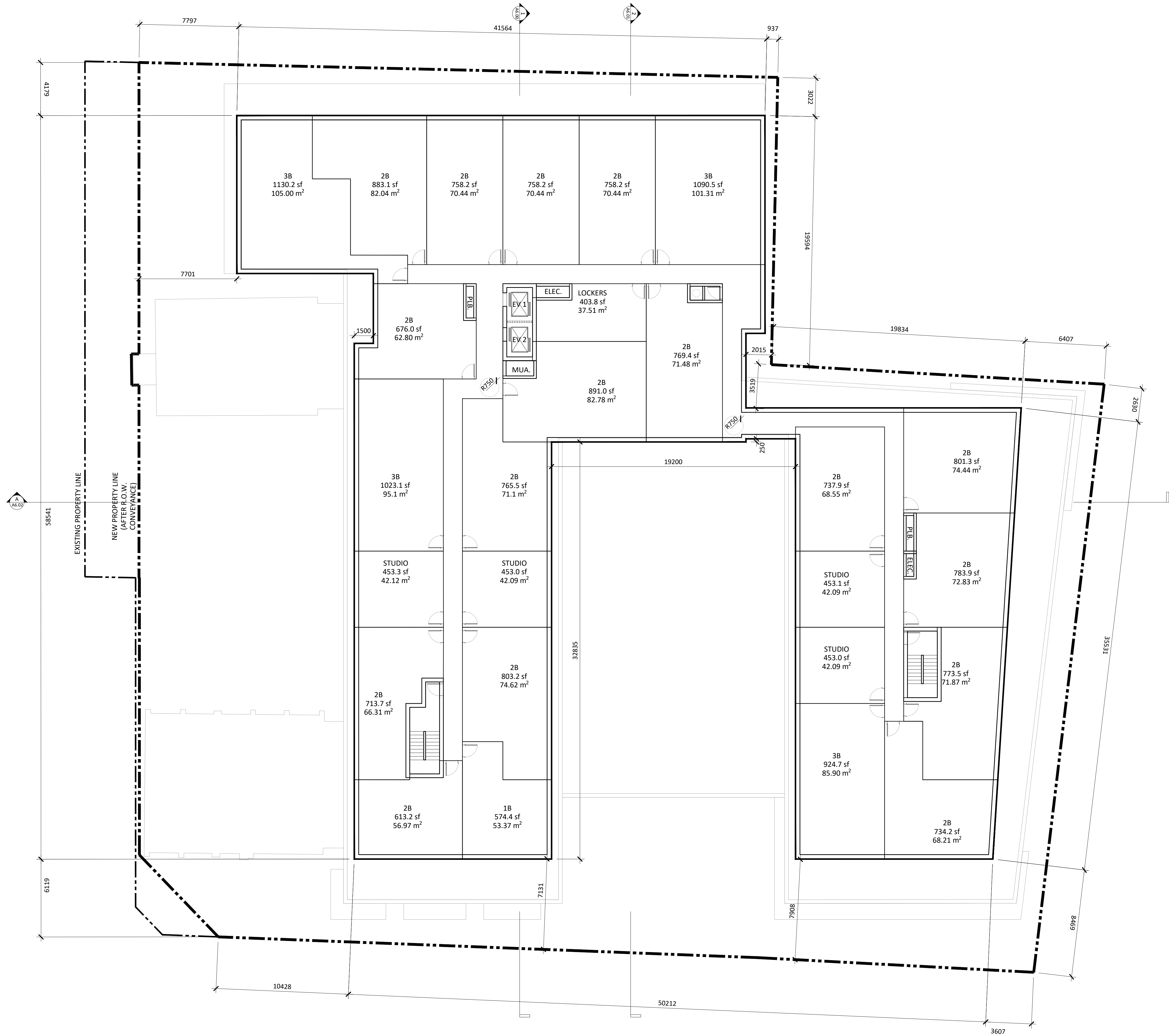
13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

3RD FLOOR PLAN

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

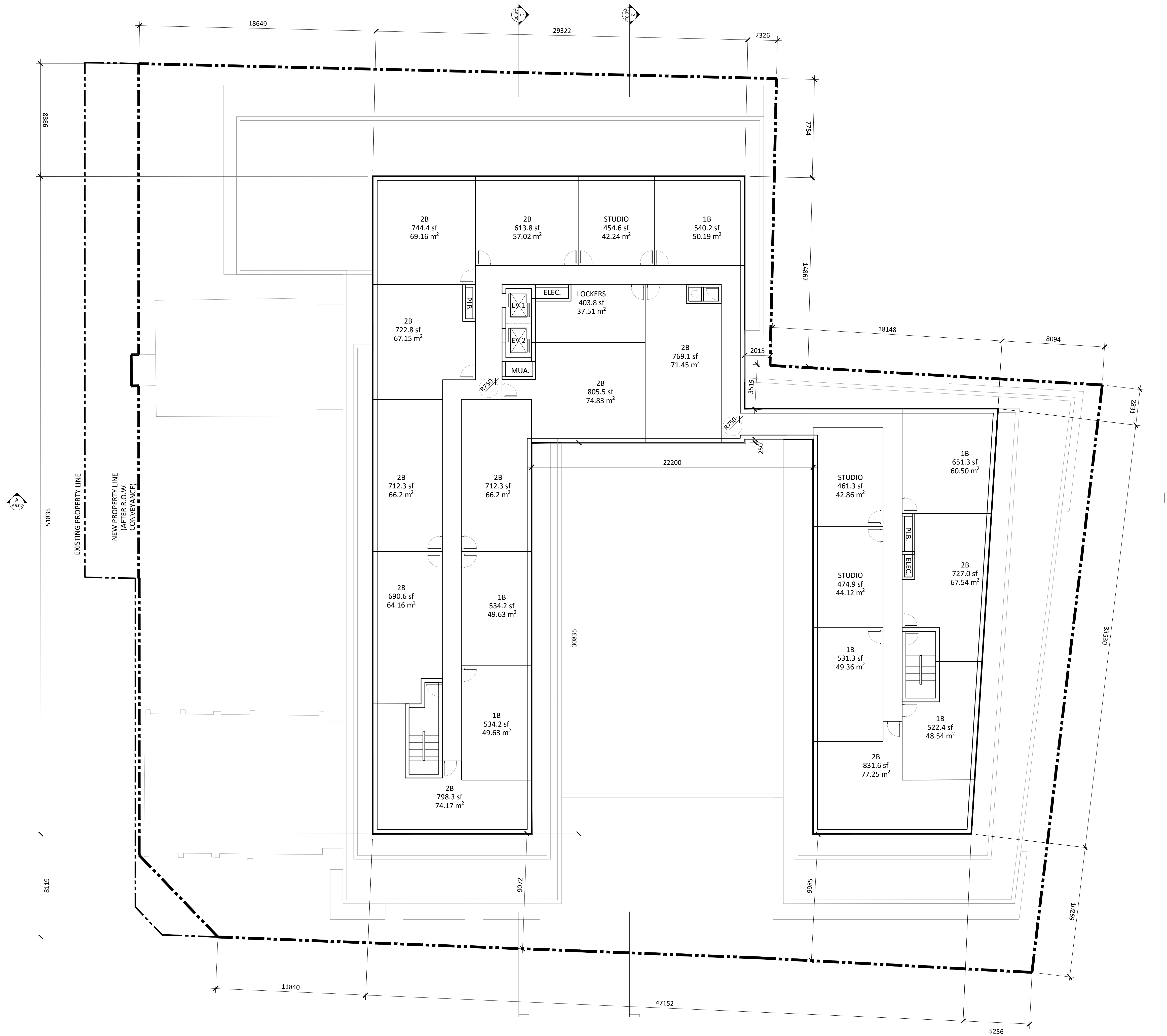
Drawing No.:

A3.03



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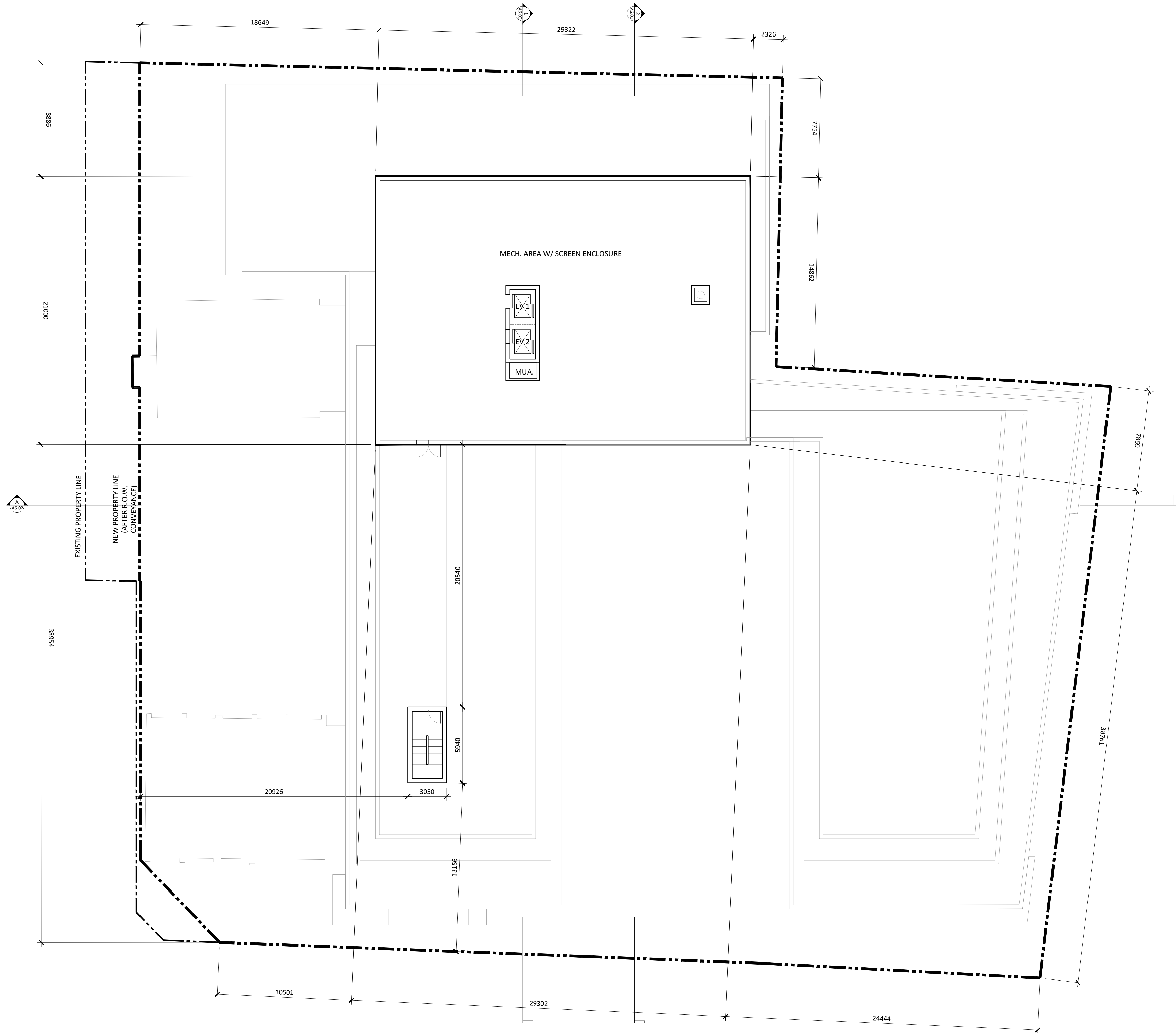
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13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

8TH FLOOR PLAN
Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A3.05



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Issued for OPA/ZBA1 May 16, 2025
Description: Date:

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MPH FLOOR PLAN

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A3.06



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Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A3.07

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13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

SOUTH ELEVATION

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

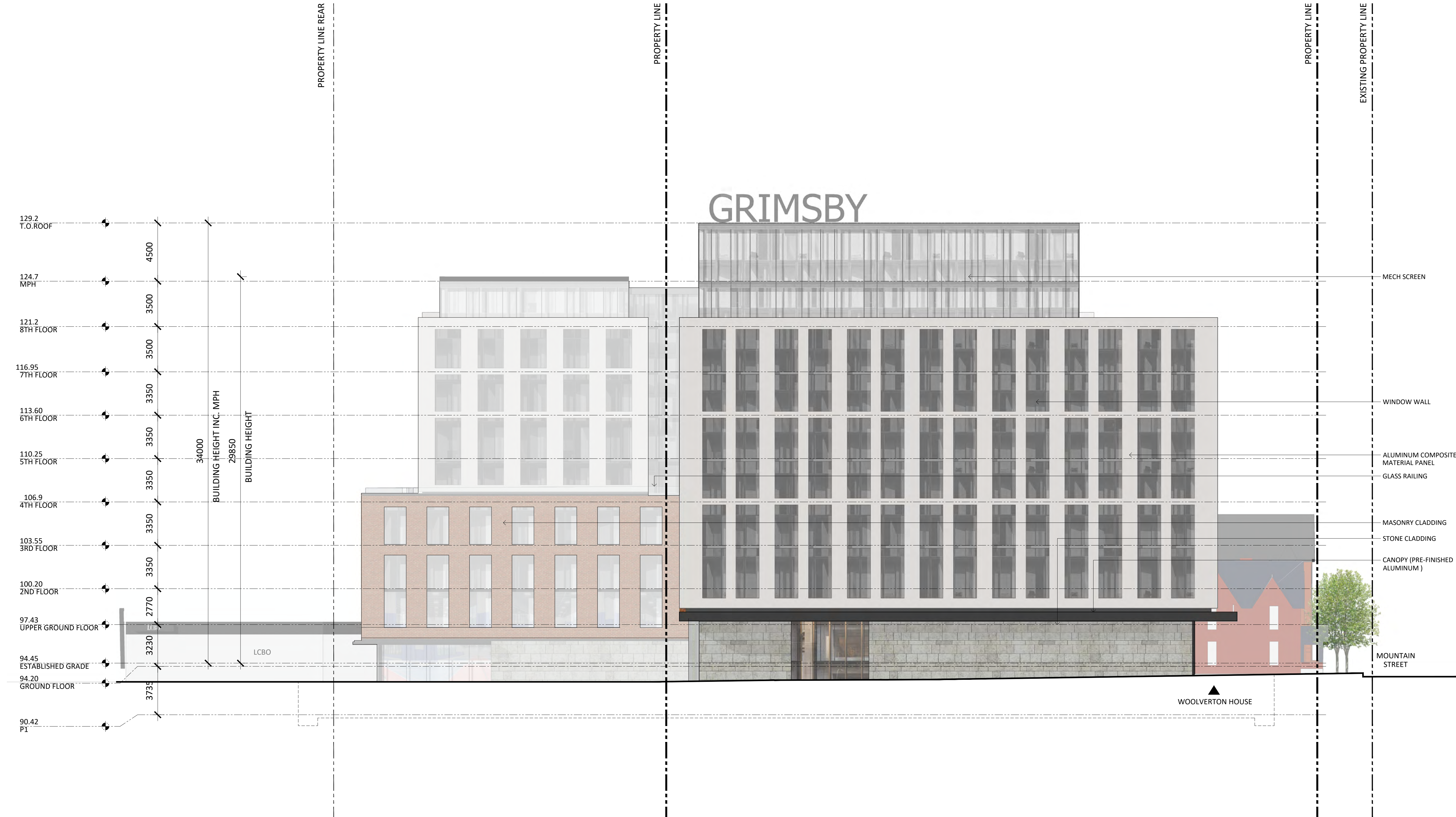
Drawing No.:

A5.00





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13 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

NORTH ELEVATION

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A5.02



23 Mountain Street & 19 - 23 Elm Street
Grimsby, ON L3M 3J7

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

A5.03



Mountain Street & 19 - 23 Elm Street
 Cambridge, ON L3M 3J7

Project No.: 2416
 Title: 1:200
 Date: May 16, 2025
 Drawn by: JCI

A5.05

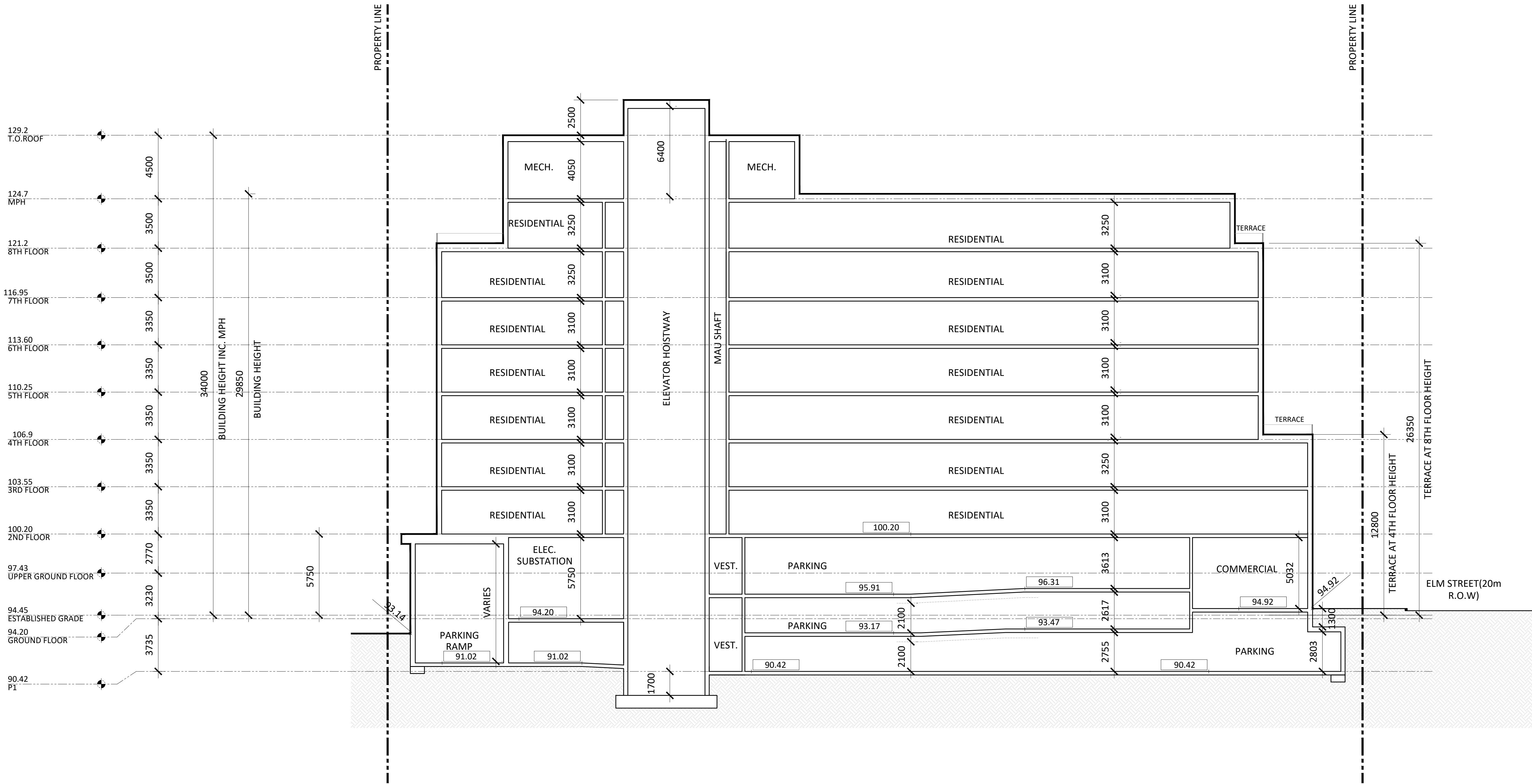




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SECTION 1

Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A6.00



Issued for OPA/ZBA1	May 16, 2025
Description:	Date:

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Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

A6.01



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Project No.: 2416
Scale: 1:150
Date: May 16, 2025
Drawn by: JCI

Drawing No.:

A6.02

Appendix B:

Woolverton Shuttle Service Proposal





Turnkey Community Shuttle Service

Provided By: Brendon Sachs

Provided For: The Woolverton



Project Name:

The Woolverton Grimsby

Project Contact:

Harley Valentine

Castlepoint Numa

180 Bloor St W #701

Toronto, ON M2S 2V6

harley@castlepointnuma.com

Introduction

Voyago is pleased to present this proposal for a turnkey shuttle service solution for the Woolverton Project in Grimsby, Ontario. We understand your vision for the Woolverton development to include a reliable, accessible, and efficient transit service connecting key destinations within the community.

With our extensive experience in delivering successful transit operations across Ontario, Voyago is confident that we can be your trusted partner in making the Woolverton Project a success, enhancing the value and appeal of your development

Scope of Project**Proposed Project Start:**

2027

Proposed Vehicle:

Ford StarTrans 16 Passenger + 2 Wheelchair (Accessible Option) or 24 Passenger

Turnkey Service:

Voyago's turnkey solution for the Woolverton Community Shuttle Service is designed to deliver exceptional value and peace of mind. We act as your trusted partner, assuming full responsibility for the shuttle's operation and leveraging our expertise to provide a cost-effective and efficient service. Our comprehensive approach includes all aspects of vehicle management, driver staffing, regulatory compliance, and day-to-day operations, freeing you from the complexities of running a transit service and allowing you to focus on the success of your development. We are committed to delivering a seamless and positive transportation experience that enhances the quality of life for Woolverton residents."

Concept Route Structure:

Please find below a draft route and schedule for the Woolverton Community Shuttle. This is a starting point for discussion and is subject to revision.

Service Hours: 9:00 AM to 5:00 PM, Options for 5 Days and 7 Days a Week (Excluding Statutory Holidays)

Concept Route:

- **Route A (Hospital):** 1 Balsam Lane -> Downtown Grimsby -> Hospital -> 1 Balsam Lane
- **Route B (GO Train):** 1 Balsam Lane -> Downtown Grimsby -> Casablanca/Costco -> 1

Balsam Lane

Simplified Concept Schedule

Time	Monday - Sunday	Route
8:30 AM	Pre-Trip Inspection	
9:00 AM	Depart Balsam Lane	Route A (Hospital)
10:00 AM	Depart Balsam Lane	Route B (Costco)
11:00 AM	Depart Balsam Lane	Route A (Hospital)
12:00 PM	Depart Balsam Lane	Route B (Costco)
1:00 PM	No Service - Driver Break	
1:30 PM	Depart Balsam Lane	Route A (Hospital)
2:30 PM	Depart Balsam Lane	Route B (Costco)
3:30 PM	Depart Balsam Lane	Route A (Hospital)
4:30 PM	Depart Balsam Lane	Route B (Costco)
5:00 PM – 5:30 PM	Post Trip and Fueling	

Stops:

- **1 Balsam Lane:** Woolverton Development
- **Downtown Grimsby:** Main St. W & Ontario St.
- **West Lincoln Memorial Hospital:** Main Entrance
- **GO/Casablanca/Costco:** Casablanca Blvd. @ QEW Park & Ride/Costco

Notes:

- **Hospital Service:** The West Lincoln Memorial Hospital is served on odd-numbered departures (9:00 AM, 11:00 AM, 1:30 PM, 3:30 PM).
- **GO/Costco Service:** The Casablanca/Costco stop is served on even-numbered departures (10:00 AM, 12:00 PM, 2:30 PM, 4:30 PM).
- **Times are approximate.** Actual arrival and departure times may vary due to traffic and other factors.

Appendix C: TTS Mode Split Data



INBOUND
Thu Feb 20 2025 08:19:00 GMT-0500 (Eastern Standard Time) - Run Time: 3256ms

Cross Tabulation Query Form - Trip - 2022

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gla06_dest

Filters:
Start time of trip - start_time In 1500-1759
and
Trip Purpose of Destination - purp_dest In H,
and
Primary travel mode of trip - mode_prime In D, U, M, P, T, S
and
2006 GTA zone of destination - gla06_dest In 6008,6009,6010,6014,6015,6016,6017

Trip 2022

Table:										North Mountain	South Mountain	East Main	West Main	East Elm	West Elm	West South Service	East Clarke	North Mountain	South Mountain	East Main	West Main	East Elm	West Elm	West South Service	East Clarke	
PD 1 of Toronto	27	0	0	0	0	0	27	PD 1 of Toronto	27	1%	80%		10%			10%		100%	1%	0%	0%	0%	0%	0%	0%	0%
PD 8 of Toronto	38	0	0	0	0	0	38	PD 8 of Toronto	38	1%	80%		10%			10%		100%	1%	0%	0%	0%	0%	0%	0%	0%
PD 9 of Toronto	0	0	0	0	12	0	12	PD 9 of Toronto	12	0%	80%		10%			10%		100%	0%	0%	0%	0%	0%	0%	0%	0%
PD 12 of Toronto	0	0	0	24	0	0	24	PD 12 of Toronto	24	1%	80%		10%			10%		100%	1%	0%	0%	0%	0%	0%	0%	0%
Mississauga	0	47	0	47	24	0	118	Mississauga	118	4%	80%		10%			10%		100%	3%	0%	0%	0%	0%	0%	0%	0%
Oakville	0	0	0	94	33	0	127	Oakville	127	4%	80%		10%			10%		100%	3%	0%	0%	0%	0%	0%	0%	0%
Burlington	0	0	16	0	51	0	67	Burlington	67	2%	80%		10%			10%		100%	2%	0%	0%	0%	0%	0%	0%	0%
Glanbrook	0	0	0	25	120	0	145	Glanbrook	145	5%	50%	50%						100%	2%	2%	0%	0%	0%	0%	0%	0%
Stoney Creek	0	0	0	56	147	40	243	Stoney Creek	243	8%	60%		20%		20%			100%	5%	0%	0%	2%	0%	2%	0%	0%
Hamilton	87	0	60	116	218	56	537	Hamilton	537	17%	80%		10%			10%		100%	14%	0%	0%	2%	0%	0%	2%	0%
Grimsby	107	0	17	408	344	141	1017	Grimsby																		
Lincoln	14	0	0	167	80	16	277	6001	12	0%	40%				40%	20%		100%	0%	0%	0%	0%	0%	0%	0%	0%
Niagara-on-the-Lake	16	0	0	0	0	13	29	6002	38	1%	33%				33%	33%		100%	0%	0%	0%	0%	0%	0%	0%	0%
St. Catharines	0	0	0	88	34	0	122	6003	111	4%		33%	30%			70%		100%	0%	0%	0%	1%	0%	0%	2%	0%
Niagara Falls	0	0	0	56	47	0	103	6004	142	5%		33%	33%					100%	0%	2%	0%	2%	0%	2%	0%	0%
West Lincoln	0	0	0	0	107	0	107	6005	143	5%	10%		40%			50%		100%	0%	0%	0%	2%	0%	2%	0%	0%
Wainfleet	0	0	20	0	0	0	20	6007	9	0%	0%	80%	7%	7%				100%	0%	0%	0%	0%	0%	0%	0%	0%
Kitchener	0	0	0	0	24	0	24	6008	14	0%		10%	20%			70%		100%	0%	0%	0%	0%	0%	0%	0%	0%
Oxford	0	0	0	47	0	0	47	6009	25	1%	10%	10%	10%	60%	10%			100%	0%	0%	0%	0%	0%	0%	0%	0%
Brantford	0	0	0	25	0	0	25	6010	350	11%	30%		70%					100%	3%	0%	0%	8%	0%	0%	0%	0%
External	0	0	0	5	0	0	5	6012	8	0%	100%							100%	0%	0%	0%	0%	0%	0%	0%	0%

Thu Feb 20 2025 08:21:37 GMT-0500 (Eastern Standard Time) - Run Time: 2985ms

Cross Tabulation Query Form - Trip - 2022

Row: 2006 GTA zone of origin - gla06_orig
Column: 2006 GTA zone of destination - gla06_dest

Filters:
Start time of trip - start_time In 1500-1759
and
Trip Purpose of Destination - purp_dest In H
and
Primary travel mode of trip - mode_prime In D
and
Planning district of origin - pd_orig In 51
and
2006 GTA zone of destination - gla06_dest In 6008

Trip 2022

Table:						
	6008	6014	6015	6016	6017	SUM
6001	12	0	0	0	0	12
6002	0	0	0	9	29	38
6003	0	0	84	27	0	111
6004	35	0	18	89	0	142
6005	0	0	0	114	29	143
6007	0	9	0	0	0	9
6008	14	0	0	0	0	14
6009	0	0	12	13	0	25
6010	22	7	250	63	8	350
6012	0	0	0	0	8	8
6014	0	0	31	0	0	31
6015	11	0	0	0	0	11
6016	0	0	0	29	68	97
6020	13	0	14	0	0	27

INBOUND
Thu Feb 20 2025 08:28:49 GMT-0500 (Eastern Standard Time) - Run Time: 3092ms

Cross Tabulation Query Form - Trip - 2022

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
Start time of trip - start_time In 1500-1759
and
Trip Purpose of Destination - purp_dest In M
and
Primary travel mode of trip - mode_prime In D U M P T S
and
2006 GTA zone of destination - gta06_dest In 6008 6009 6010 6014 6015 6016 6017

Trip 2022
Table:

	6008	6009	6010	6016	6017	SUM			North Mountain	South Mountain	East Main	West Main	East Elm	West Elm	West South Service	East Clarke		North Mountain	South Mountain	East Main	West Main	East Elm	West Elm	West South Service	East Clarke
PD 11 of Toronto	0	0	0	18	0	18	PD 11 of Toronto	18	2%	80%		33%					100%	1%	0%	0%	0%	0%	0%	0%	0%
Stoney Creek	0	29	43	0	0	72	Stoney Creek	72	7%	60%		20%		20%		100%	4%	0%	0%	1%	0%	1%	0%	0%	0%
Hamilton	0	89	18	0	0	107	Hamilton	107	10%	80%		10%			10%	100%	8%	0%	0%	1%	0%	0%	1%	0%	0%
Grimsby	14	441	232	21	16	724	Grimsby							70%		100%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Lincoln	0	29	38	0	0	67	6003	12	1%		30%					100%	0%	0%	0%	0%	0%	0%	1%	0%	0%
St. Catharines	0	20	0	0	0	20	6004	219	20%		33%			33%		100%	0%	7%	0%	7%	0%	7%	0%	0%	0%
West Lincoln	11	47	9	0	0	67	6005	31	3%	10%		40%		50%		100%	0%	0%	0%	1%	0%	1%	0%	0%	0%
							6007	32	3%		80%		7%			100%	0%	2%	0%	0%	0%	0%	0%	0%	0%
							6008	14	1%		10%			70%		100%	0%	0%	0%	0%	0%	1%	0%	0%	0%
							6009	47	4%	10%		10%		10%		100%	0%	0%	0%	0%	3%	0%	0%	0%	0%
							6010	37	3%	30%						100%	1%	0%	0%	2%	0%	0%	0%	0%	0%
							6012	33	3%	100%						100%	3%	0%	0%	0%	0%	0%	0%	0%	0%
							6014	7	1%				50%		50%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Row: 2006 GTA zone of origin - gta06_orig							6015	60	6%						50%	100%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Column: 2006 GTA zone of destination - gta06_dest							6016	41	4%	20%		40%			40%	100%	0%	1%	0%	0%	2%	0%	0%	2%	0%
							6017	8	1%	50%						100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
							6018	34	3%	60%		20%			20%	100%	2%	0%	0%	0%	1%	0%	0%	1%	0%
							6019	39	4%	50%		25%			25%	100%	2%	0%	0%	0%	1%	0%	0%	1%	0%
Filters:							6020	108	10%		33%				33%	100%	0%	3%	0%	0%	3%	0%	0%	3%	0%
Start time of trip - start_time In 1500-1759							Lincoln	67	6%	40%	60%					100%	2%	4%	0%	0%	0%	0%	0%	0%	0%
and							St. Catharines	20	2%	100%						100%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Primary travel mode of trip - mode_prime In D	U	M	P	T	S		West Lincoln	67	6%	50%			30%	20%		100%	0%	3%	0%	0%	2%	1%	0%	0%	0%
2006 GTA zone of destination - gta06_dest In 6008	6009		6010	6014	6015	6016	6017	Total	1073	100%							26.3%	21.1%	0.0%	14.1%	14.6%	12.4%	1.9%	9.5%	100%
																	Rounded	26%	21%	0%	14%	15%	12%	2%	10%
																	Adopted	26%	21%	0%	14%	15%	12%	2%	10%

Trip 2022
Table:

	6008	6009	6010	6016	6017	SUM
6003	0	0	12	0	0	12
6004	0	195	24	0	0	219
6005	0	31	0	0	0	31
6007	0	0	32	0	0	32
6008	14	0	0	0	0	14
6009	0	16	19	12	0	47
6010	0	6	31	0	0	37
6012	0	33	0	0	0	33
6014	0	0	7	0	0	7
6015	0	44	0	0	16	60
6016	0	41	0	0	0	41
6017	0	0	8	0	0	8
6018	0	34	0	0	0	34
6019	0	30	0	9	0	39
6020	0	9	99	0	0	108

Appendix D: Turning Movement Counts





Turning Movement Count (1 . MOUNTAIN ST & MAIN ST)

Start Time	N Approach MOUNTAIN ST						E Approach MAIN ST						S Approach MOUNTAIN ST						W Approach MAIN ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	16	16	19	0	2	51	20	36	0	0	0	56	4	43	11	0	0	58	5	13	19	0	0	37	202		
07:15:00	31	18	7	0	2	56	20	31	0	0	0	51	0	49	9	0	1	58	8	31	24	0	0	63	228		
07:30:00	30	20	12	0	4	62	23	42	1	0	0	66	6	35	13	0	3	54	12	38	28	0	4	78	260		
07:45:00	33	32	16	0	5	81	13	63	0	0	0	76	0	49	28	0	3	77	14	55	24	0	3	93	327	1017	
08:00:00	35	37	14	0	3	86	24	64	0	0	1	88	4	52	7	0	4	63	12	42	44	0	0	98	335	1150	
08:15:00	39	44	16	0	4	99	13	54	0	0	0	67	8	47	19	0	2	74	11	37	31	0	0	79	319	1241	
08:30:00	44	43	12	0	2	99	13	64	1	0	2	78	10	42	18	0	4	70	13	43	31	0	0	87	334	1315	
08:45:00	67	53	25	0	7	145	11	75	0	0	0	86	3	73	26	0	2	102	13	53	31	0	3	97	430	1418	
BREAK																											
16:00:00	59	60	0	0	9	119	0	0	0	0	15	0	0	77	37	0	61	114	43	0	73	0	0	116	349		
16:15:00	44	67	0	0	7	111	0	0	0	0	5	0	0	88	31	0	58	119	39	0	72	0	1	111	341		
16:30:00	56	65	0	0	7	121	0	0	0	0	3	0	0	74	36	0	51	110	45	0	84	0	6	129	360		
16:45:00	44	73	0	0	7	117	0	0	0	0	6	0	0	75	31	0	51	106	31	0	65	0	0	96	319	1369	
17:00:00	63	78	0	0	8	141	0	0	0	0	7	0	0	59	48	0	40	107	41	0	75	0	4	116	364	1384	
17:15:00	61	68	0	0	5	129	0	0	0	0	9	0	0	70	44	0	64	114	39	0	73	0	3	112	355	1398	
17:30:00	74	55	0	0	9	129	0	0	0	0	10	0	0	51	43	0	40	94	47	0	58	0	1	105	328	1366	
17:45:00	86	60	0	0	16	146	0	0	0	0	3	0	0	51	39	0	46	90	31	0	54	0	1	85	321	1368	
Grand Total	782	789	121	0	97	1692	137	429	2	0	61	568	35	935	440	0	430	1410	404	312	786	0	26	1502	5172	-	
Approach%	46.2%	46.6%	7.2%	0%		-	24.1%	75.5%	0.4%	0%		-	2.5%	66.3%	31.2%	0%		-	26.9%	20.8%	52.3%	0%		-	-	-	
Totals %	15.1%	15.3%	2.3%	0%		32.7%	2.6%	8.3%	0%	0%		11%	0.7%	18.1%	8.5%	0%		27.3%	7.8%	6%	15.2%	0%		29%	-	-	
Heavy	16	54	5	0		-	4	15	0	0		-	0	71	7	0		-	4	14	13	0		-	-	-	
Heavy %	2%	6.8%	4.1%	0%		-	2.9%	3.5%	0%	0%		-	0%	7.6%	1.6%	0%		-	1%	4.5%	1.7%	0%		-	-	-	
Bicycles	0	0	0	0		-	0	12	0	0		-	0	1	0	0		-	1	7	3	0		-	-	-	
Bicycle %	0%	0%	0%	0%		-	0%	2.8%	0%	0%		-	0%	0.1%	0%	0%		-	0.2%	2.2%	0.4%	0%		-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)

Start Time	N Approach MOUNTAIN ST						E Approach MAIN ST						S Approach MOUNTAIN ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	35	37	14	0	3	86	24	64	0	0	1	88	4	52	7	0	4	63	12	42	44	0	0	98	335
08:15:00	39	44	16	0	4	99	13	54	0	0	0	67	8	47	19	0	2	74	11	37	31	0	0	79	319
08:30:00	44	43	12	0	2	99	13	64	1	0	2	78	10	42	18	0	4	70	13	43	31	0	0	87	334
08:45:00	67	53	25	0	7	145	11	75	0	0	0	86	3	73	26	0	2	102	13	53	31	0	3	97	430
Grand Total	185	177	67	0	16	429	61	257	1	0	3	319	25	214	70	0	12	309	49	175	137	0	3	361	1418
Approach%	43.1%	41.3%	15.6%	0%		-	19.1%	80.6%	0.3%	0%		-	8.1%	69.3%	22.7%	0%		-	13.6%	48.5%	38%	0%		-	-
Totals %	13%	12.5%	4.7%	0%		30.3%	4.3%	18.1%	0.1%	0%		22.5%	1.8%	15.1%	4.9%	0%		21.8%	3.5%	12.3%	9.7%	0%		25.5%	-
PHF	0.69	0.83	0.67	0		0.74	0.64	0.86	0.25	0		0.91	0.63	0.73	0.67	0		0.76	0.94	0.83	0.78	0		0.92	-
Heavy	4	20	3	0		27	3	4	0	0		7	0	26	3	0		29	0	7	4	0		11	-
Heavy %	2.2%	11.3%	4.5%	0%		6.3%	4.9%	1.6%	0%	0%		2.2%	0%	12.1%	4.3%	0%		9.4%	0%	4%	2.9%	0%		3%	-
Lights	181	157	64	0		402	58	253	1	0		312	25	188	67	0		280	49	168	133	0		350	-
Lights %	97.8%	88.7%	95.5%	0%		93.7%	95.1%	98.4%	100%	0%		97.8%	100%	87.9%	95.7%	0%		90.6%	100%	96%	97.1%	0%		97%	-
Single-Unit Trucks	0	11	3	0		14	3	3	0	0		6	0	13	2	0		15	0	3	1	0		4	-
Single-Unit Trucks %	0%	6.2%	4.5%	0%		3.3%	4.9%	1.2%	0%	0%		1.9%	0%	6.1%	2.9%	0%		4.9%	0%	1.7%	0.7%	0%		1.1%	-
Buses	4	4	0	0		8	0	1	0	0		1	0	6	0	0		6	0	4	3	0		7	-
Buses %	2.2%	2.3%	0%	0%		1.9%	0%	0.4%	0%	0%		0.3%	0%	2.8%	0%	0%		1.9%	0%	2.3%	2.2%	0%		1.9%	-
Articulated Trucks	0	5	0	0		5	0	0	0	0		0	0	7	1	0		8	0	0	0	0		0	-
Articulated Trucks %	0%	2.8%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	3.3%	1.4%	0%		2.6%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	3	-	-	-	-	-	11	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	47.1%	-	-	-	-	-	8.8%	-	-	-	-	-	32.4%	-	-	-	-	-	8.8%	-	-
Bicycles on Road	0	0	0	0	0	-	0	8	0	0	0	-	0	0	0	0	0	-	1	1	1	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	2.9%	-	-	-	-	-	0%	-	-



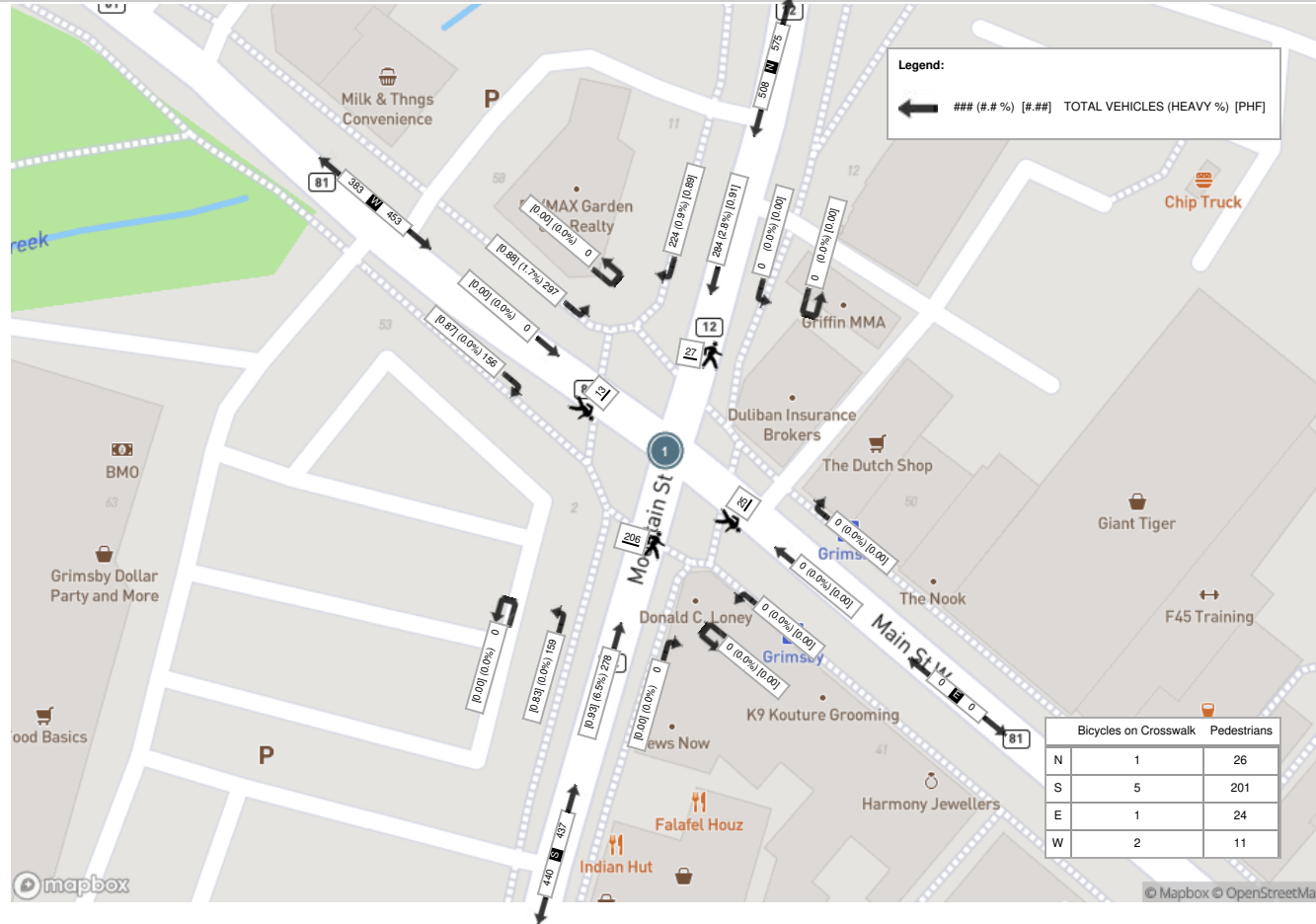
Peak Hour: 04:30 PM - 05:30 PM Weather: Scattered Clouds (22.02 °C)

Start Time	N Approach MOUNTAIN ST						E Approach MAIN ST						S Approach MOUNTAIN ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	56	65	0	0	7	121	0	0	0	0	3	0	0	74	36	0	51	110	45	0	84	0	6	129	360
16:45:00	44	73	0	0	7	117	0	0	0	0	6	0	0	75	31	0	51	106	31	0	65	0	0	96	319
17:00:00	63	78	0	0	8	141	0	0	0	0	7	0	0	59	48	0	40	107	41	0	75	0	4	116	364
17:15:00	61	68	0	0	5	129	0	0	0	0	9	0	0	70	44	0	64	114	39	0	73	0	3	112	355
Grand Total	224	284	0	0	27	508	0	0	0	0	25	0	0	278	159	0	206	437	156	0	297	0	13	453	1398
Approach%	44.1%	55.9%	0%	0%	-	-	0%	0%	0%	0%	-	0%	63.6%	36.4%	0%	-	-	34.4%	0%	65.6%	0%	-	-	-	
Totals %	16%	20.3%	0%	0%	36.3%	0%	0%	0%	0%	0%	0%	0%	19.9%	11.4%	0%	31.3%	11.2%	0%	21.2%	0%	32.4%	-	-	-	
PHF	0.89	0.91	0	0	0.9	0	0	0	0	0	0	0	0.93	0.83	0	0.96	0.87	0	0.88	0	0.88	-	-	-	
Heavy	2	8	0	0	10	0	0	0	0	0	0	0	18	0	0	18	0	0	5	0	5	-	-	-	
Heavy %	0.9%	2.8%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	6.5%	0%	0%	4.1%	0%	0%	1.7%	0%	1.1%	-	-	-	
Lights	222	276	0	0	498	0	0	0	0	0	0	0	260	159	0	419	156	0	292	0	448	-	-	-	
Lights %	99.1%	97.2%	0%	0%	98%	0%	0%	0%	0%	0%	0%	0%	93.5%	100%	0%	95.9%	100%	0%	98.3%	0%	98.9%	-	-	-	
Single-Unit Trucks	2	4	0	0	6	0	0	0	0	0	0	0	9	0	0	9	0	0	3	0	3	-	-	-	
Single-Unit Trucks %	0.9%	1.4%	0%	0%	1.2%	0%	0%	0%	0%	0%	0%	0%	3.2%	0%	0%	2.1%	0%	0%	1%	0%	0.7%	-	-	-	
Buses	0	2	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	2	0	2	-	-	-	
Buses %	0%	0.7%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0.7%	0%	0%	0.5%	0%	0%	0.7%	0%	0.4%	-	-	-	
Articulated Trucks	0	2	0	0	2	0	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	-	-	-	
Articulated Trucks %	0%	0.7%	0%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	2.5%	0%	0%	1.6%	0%	0%	0%	0%	0%	-	-	-	
Pedestrians	-	-	-	-	26	-	-	-	-	-	24	-	-	-	-	-	201	-	-	-	-	11	-	-	
Pedestrians%	-	-	-	-	9.6%	-	-	-	-	-	8.9%	-	-	-	-	-	74.2%	-	-	-	-	4.1%	-	-	
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	1	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	0%	-	-	
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	2	-	-	
Bicycles on Crosswalk%	-	-	-	-	0.4%	-	-	-	-	-	0.4%	-	-	-	-	-	1.8%	-	-	-	-	0.7%	-	-	

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Scattered Clouds (22.02 °C)





Turning Movement Count (5 . MOUNTAIN ST & ELM ST)

Start Time	N Approach MOUNTAIN ST (CHRISTIE ST RR12)						E Approach ELM ST						S Approach MOUNTAIN ST (CHRISTIE ST RR12)						W Approach ELM ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	3	18	1	0	0	22	0	21	6	0	0	27	4	49	13	0	0	66	8	16	3	0	0	27	142		
07:15:00	1	28	1	0	0	30	0	18	4	0	0	22	9	55	20	0	0	84	7	12	3	0	0	22	158		
07:30:00	1	26	1	0	0	28	0	21	11	0	0	32	10	49	18	0	1	77	5	21	7	0	1	33	170		
07:45:00	3	41	2	0	1	46	0	43	10	0	0	53	7	79	38	0	1	124	13	26	3	0	0	42	265	735	
08:00:00	2	38	1	0	1	41	0	43	10	0	0	53	9	57	13	0	0	79	11	20	7	0	0	38	211	804	
08:15:00	4	43	1	0	1	48	1	29	10	0	0	40	12	65	13	0	2	90	10	32	9	0	1	51	229	875	
08:30:00	2	46	2	0	2	50	1	30	10	0	2	41	12	59	16	0	3	87	10	20	2	0	0	32	210	915	
08:45:00	11	38	2	0	4	51	2	30	7	0	0	39	26	85	29	0	0	140	9	31	16	0	2	56	286	936	
BREAK																											
16:00:00	9	46	35	0	2	90	23	76	18	0	1	117	21	59	10	0	2	90	36	81	16	0	0	133	430		
16:15:00	3	53	28	0	4	84	24	79	17	0	1	120	24	69	13	0	0	106	30	91	16	0	2	137	447		
16:30:00	6	65	34	0	2	105	18	81	15	0	0	114	26	68	20	0	1	114	29	79	10	0	3	118	451		
16:45:00	6	49	24	0	2	79	20	76	19	0	0	115	16	61	17	0	0	94	26	96	19	0	0	141	429	1757	
17:00:00	5	73	31	0	1	109	19	87	18	0	0	124	21	56	22	0	2	99	28	68	10	0	2	106	438	1765	
17:15:00	7	62	24	0	7	93	17	92	29	0	2	138	21	65	24	0	0	110	20	70	9	0	0	99	440	1758	
17:30:00	5	63	28	0	0	96	24	99	15	0	3	138	20	46	19	0	0	85	25	65	10	0	0	100	419	1726	
17:45:00	6	66	19	0	0	91	37	71	18	0	2	126	25	53	21	0	0	99	20	60	9	0	0	89	405	1702	
Grand Total	74	755	234	0	27	1063	186	896	217	0	11	1299	263	975	306	0	12	1544	287	788	149	0	11	1224	5130	-	
Approach%	7%	71%	22%	0%	-	-	14.3%	69%	16.7%	0%	-	-	17%	63.1%	19.8%	0%	-	-	23.4%	64.4%	12.2%	0%	-	-	-	-	
Totals %	1.4%	14.7%	4.6%	0%	-	20.7%	3.6%	17.5%	4.2%	0%	-	25.3%	5.1%	19%	6%	0%	-	30.1%	5.6%	15.4%	2.9%	0%	-	23.9%	-	-	
Heavy	2	58	2	0	-	-	1	14	8	0	-	-	11	71	21	0	-	-	22	9	8	0	-	-	-	-	
Heavy %	2.7%	7.7%	0.9%	0%	-	-	0.5%	1.6%	3.7%	0%	-	-	4.2%	7.3%	6.9%	0%	-	-	7.7%	1.1%	5.4%	0%	-	-	-	-	
Bicycles	0	0	0	0	-	-	0	0	0	0	-	-	0	0	2	0	-	-	0	1	1	0	-	-	-	-	
Bicycle %	0%	0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	0%	0.7%	0%	-	-	0%	0.1%	0.7%	0%	-	-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)

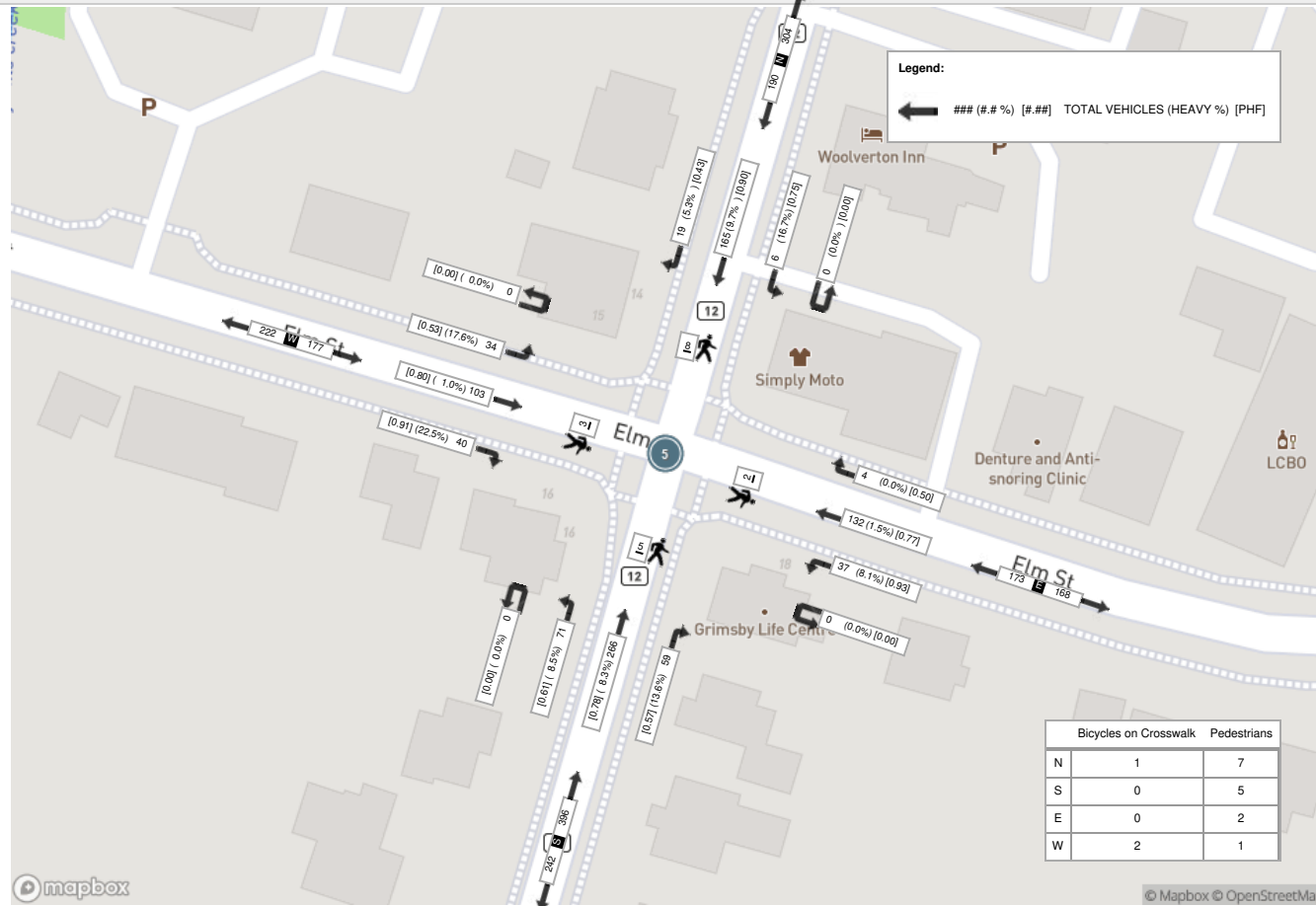
Start Time	N Approach MOUNTAIN ST (CHRISTIE ST RR12)						E Approach ELM ST						S Approach MOUNTAIN ST (CHRISTIE ST RR12)						W Approach ELM ST						Int. Total (15 min)	
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total		
08:00:00	2	38	1	0	1	41	0	43	10	0	0	53	9	57	13	0	0	79	11	20	7	0	0	38	211	
08:15:00	4	43	1	0	1	48	1	29	10	0	0	40	12	65	13	0	2	90	10	32	9	0	1	51	229	
08:30:00	2	46	2	0	2	50	1	30	10	0	2	41	12	59	16	0	3	87	10	20	2	0	0	32	210	
08:45:00	11	38	2	0	4	51	2	30	7	0	0	39	26	85	29	0	0	140	9	31	16	0	2	56	286	
Grand Total	19	165	6	0	8	190	4	132	37	0	2	173	59	266	71	0	5	396	40	103	34	0	3	177	936	
Approach%	10%	86.8%	3.2%	0%		-	2.3%	76.3%	21.4%	0%		-	14.9%	67.2%	17.9%	0%		-	22.6%	58.2%	19.2%	0%		-	-	
Totals %	2%	17.6%	0.6%	0%		20.3%	0.4%	14.1%	4%	0%		18.5%	6.3%	28.4%	7.6%	0%		42.3%	4.3%	11%	3.6%	0%		18.9%	-	
PHF	0.43	0.9	0.75	0		0.93	0.5	0.77	0.93	0		0.82	0.57	0.78	0.61	0		0.71	0.91	0.8	0.53	0		0.79	-	
Heavy	1	16	1	0		18	0	2	3	0		5	8	22	6	0		36	9	1	6	0		16	-	
Heavy %	5.3%	9.7%	16.7%	0%		9.5%	0%	1.5%	8.1%	0%		2.9%	13.6%	8.3%	8.5%	0%		9.1%	22.5%	1%	17.6%	0%		9%	-	
Lights	18	149	5	0		172	4	130	34	0		168	51	244	65	0		360	31	102	28	0		161	-	
Lights %	94.7%	90.3%	83.3%	0%		90.5%	100%	98.5%	91.9%	0%		97.1%	86.4%	91.7%	91.5%	0%		90.9%	77.5%	99%	82.4%	0%		91%	-	
Single-Unit Trucks	0	11	0	0		11	0	1	2	0		3	3	11	0	0		14	3	1	3	0		7	-	
Single-Unit Trucks %	0%	6.7%	0%	0%		5.8%	0%	0.8%	5.4%	0%		1.7%	5.1%	4.1%	0%	0%		3.5%	7.5%	1%	8.8%	0%		4%	-	
Buses	1	2	1	0		4	0	1	0	0		1	4	4	6	0		14	6	0	2	0		8	-	
Buses %	5.3%	1.2%	16.7%	0%		2.1%	0%	0.8%	0%	0%		0.6%	6.8%	1.5%	8.5%	0%		3.5%	15%	0%	5.9%	0%		4.5%	-	
Articulated Trucks	0	3	0	0		3	0	0	1	0		1	1	7	0	0		8	0	0	1	0		1	-	
Articulated Trucks %	0%	1.8%	0%	0%		1.6%	0%	0%	2.7%	0%		0.6%	1.7%	2.6%	0%	0%		2%	0%	0%	2.9%	0%		0.6%	-	
Pedestrians	-	-	-	-	7		-	-	-	-	2		-	-	-	-	5		-	-	-	-	1		-	-
Pedestrians%	-	-	-	-	38.9%		-	-	-	-	11.1%		-	-	-	-	27.8%		-	-	-	-	5.6%		-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-
Bicycles on Crosswalk%	-	-	-	-	5.6%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	11.1%		-	-



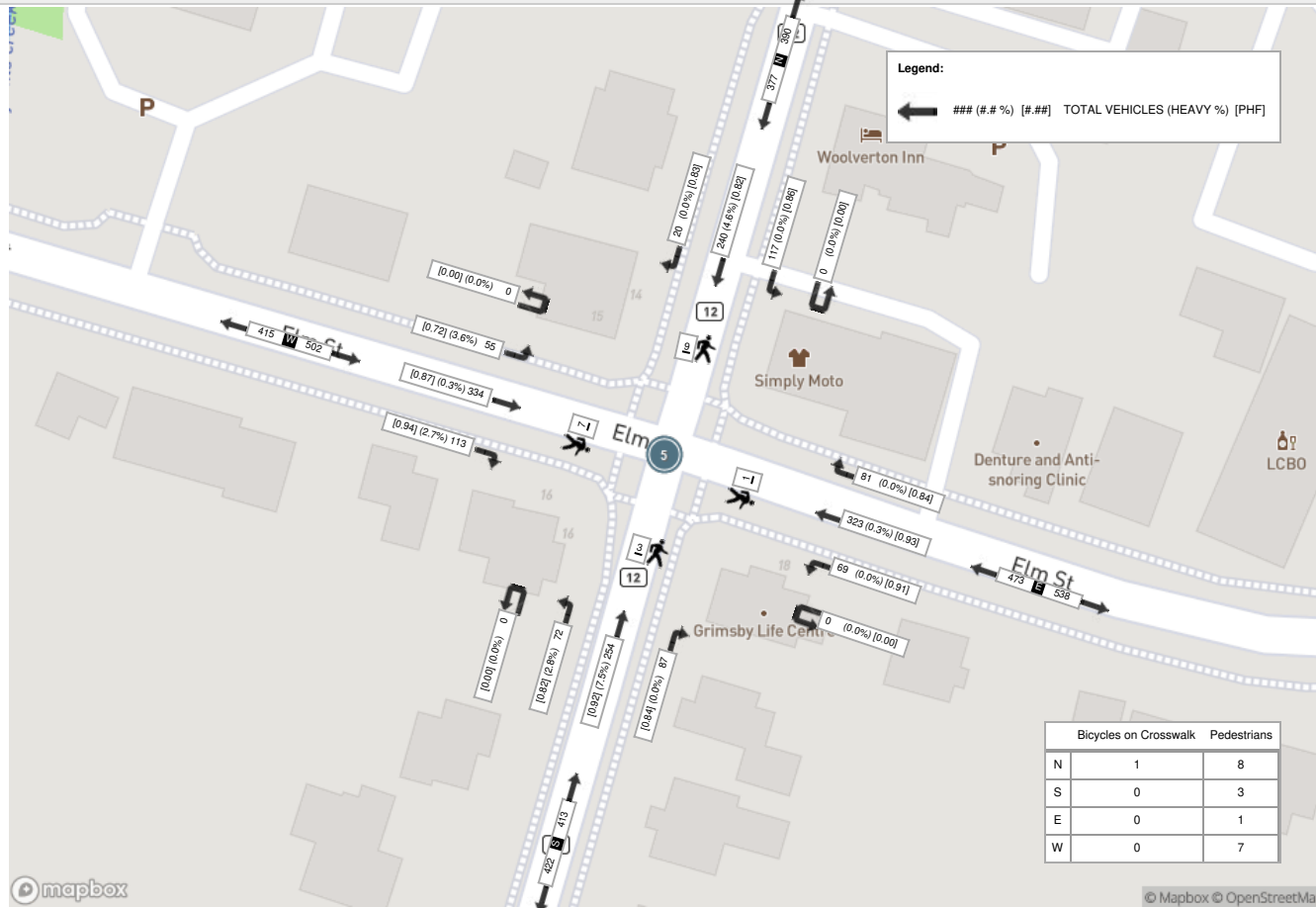
Peak Hour: 04:15 PM - 05:15 PM Weather: Scattered Clouds (22.02 °C)

Start Time	N Approach MOUNTAIN ST (CHRISTIE ST RR12)						E Approach ELM ST						S Approach MOUNTAIN ST (CHRISTIE ST RR12)						W Approach ELM ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	3	53	28	0	4	84	24	79	17	0	1	120	24	69	13	0	0	106	30	91	16	0	2	137	447
16:30:00	6	65	34	0	2	105	18	81	15	0	0	114	26	68	20	0	1	114	29	79	10	0	3	118	451
16:45:00	6	49	24	0	2	79	20	76	19	0	0	115	16	61	17	0	0	94	26	96	19	0	0	141	429
17:00:00	5	73	31	0	1	109	19	87	18	0	0	124	21	56	22	0	2	99	28	68	10	0	2	106	438
Grand Total	20	240	117	0	9	377	81	323	69	0	1	473	87	254	72	0	3	413	113	334	55	0	7	502	1765
Approach%	5.3%	63.7%	31%	0%	-	-	17.1%	68.3%	14.6%	0%	-	-	21.1%	61.5%	17.4%	0%	-	-	22.5%	66.5%	11%	0%	-	-	-
Totals %	1.1%	13.6%	6.6%	0%	21.4%	4.6%	18.3%	3.9%	0%	26.8%	4.9%	14.4%	4.1%	0%	23.4%	6.4%	18.9%	3.1%	0%	28.4%	-	-	-	-	
PHF	0.83	0.82	0.86	0	0.86	0.84	0.93	0.91	0	0.95	0.84	0.92	0.82	0	0.91	0.94	0.87	0.72	0	0.89	-	-	-	-	
Heavy	0	11	0	0	11	0	1	0	0	1	0	19	2	0	21	3	1	2	0	6	-	-	-	-	
Heavy %	0%	4.6%	0%	0%	2.9%	0%	0.3%	0%	0%	0.2%	0%	7.5%	2.8%	0%	5.1%	2.7%	0.3%	3.6%	0%	1.2%	-	-	-	-	
Lights	20	229	117	0	366	81	322	69	0	472	87	235	70	0	392	110	333	53	0	496	-	-	-	-	
Lights %	100%	95.4%	100%	0%	97.1%	100%	99.7%	100%	0%	99.8%	100%	92.5%	97.2%	0%	94.9%	97.3%	99.7%	96.4%	0%	98.8%	-	-	-	-	
Single-Unit Trucks	0	5	0	0	5	0	1	0	0	1	0	9	1	0	10	2	1	0	0	3	-	-	-	-	
Single-Unit Trucks %	0%	2.1%	0%	0%	1.3%	0%	0.3%	0%	0%	0.2%	0%	3.5%	1.4%	0%	2.4%	1.8%	0.3%	0%	0%	0.6%	-	-	-	-	
Buses	0	2	0	0	2	0	0	0	0	0	0	2	1	0	3	1	0	2	0	3	-	-	-	-	
Buses %	0%	0.8%	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0.8%	1.4%	0%	0.7%	0.9%	0%	3.6%	0%	0.6%	-	-	-	-	
Articulated Trucks	0	4	0	0	4	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	-	-	-	-	
Articulated Trucks %	0%	1.7%	0%	0%	1.1%	0%	0%	0%	0%	0%	0%	3.1%	0%	0%	1.9%	0%	0%	0%	0%	0%	-	-	-	-	
Pedestrians	-	-	-	-	8	-	-	-	-	1	-	-	-	-	3	-	-	-	-	7	-	-	-	-	
Pedestrians%	-	-	-	-	40%	-	-	-	-	5%	-	-	-	-	15%	-	-	-	-	35%	-	-	-	-	
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	5%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Scattered Clouds (22.02 °C)





Turning Movement Count (2 . MOUNTAIN ST & BALSAM LN)

Start Time	N Approach MOUNTAIN ST						E Approach BALSAM LN						S Approach MOUNTAIN ST						W Approach WEST DRIVEWAY						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	2	21	0	0	0	23	0	0	1	0	2	1	1	52	1	0	0	54	1	0	2	0	0	3	81		
07:15:00	1	29	1	0	0	31	0	0	0	0	0	0	0	55	1	0	0	56	0	1	0	0	1	1	88		
07:30:00	0	26	4	0	0	30	3	0	1	0	3	4	2	54	0	0	0	56	1	0	1	0	1	2	92		
07:45:00	4	45	0	0	0	49	1	0	0	0	0	1	3	76	1	0	1	80	0	0	0	0	1	0	130	391	
08:00:00	4	37	4	0	0	45	1	0	1	0	0	2	1	59	5	0	1	65	2	0	1	0	0	3	115	425	
08:15:00	6	47	5	0	1	58	2	1	0	0	0	3	3	71	1	0	0	75	1	1	2	0	0	4	140	477	
08:30:00	5	50	7	0	1	62	5	1	0	0	1	6	1	61	1	0	0	63	0	0	7	0	0	7	138	523	
08:45:00	6	55	5	0	2	66	2	0	0	0	0	2	3	96	2	0	0	101	0	0	4	0	2	4	173	566	
BREAK																											
16:00:00	7	72	18	0	2	97	17	1	1	0	2	19	4	86	8	0	1	98	9	2	8	0	0	19	233		
16:15:00	10	85	10	0	8	105	18	5	1	0	0	24	8	97	3	0	2	108	9	3	8	0	2	20	257		
16:30:00	9	83	17	0	0	109	19	5	1	0	1	25	7	84	5	0	1	96	12	3	7	0	0	22	252		
16:45:00	12	77	24	0	6	113	15	5	2	0	0	22	5	93	3	0	1	101	6	7	7	0	1	20	256	998	
17:00:00	13	90	8	0	1	111	17	4	7	0	0	28	4	73	6	0	0	83	6	2	5	0	0	13	235	1000	
17:15:00	10	86	15	0	0	111	18	2	1	0	0	21	1	89	5	0	0	95	10	0	7	0	0	17	244	987	
17:30:00	9	77	14	0	5	100	22	2	9	0	4	33	2	75	2	0	0	79	7	1	2	0	1	10	222	957	
17:45:00	8	76	9	0	0	93	9	1	5	0	0	15	5	88	7	0	0	100	10	3	5	0	0	18	226	927	
Grand Total	106	956	141	0	26	1203	149	27	30	0	13	206	50	1209	51	0	7	1310	74	23	66	0	9	163	2882	-	
Approach%	8.8%	79.5%	11.7%	0%		-	72.3%	13.1%	14.6%	0%		-	3.8%	92.3%	3.9%	0%		-	45.4%	14.1%	40.5%	0%		-	-	-	
Totals %	3.7%	33.2%	4.9%	0%		41.7%	5.2%	0.9%	1%	0%		7.1%	1.7%	42%	1.8%	0%		45.5%	2.6%	0.8%	2.3%	0%		5.7%	-	-	
Heavy	0	59	0	0		-	1	0	0	0		-	0	78	0	0		-	0	0	0	0		-	-	-	
Heavy %	0%	6.2%	0%	0%		-	0.7%	0%	0%	0%		-	0%	6.5%	0%	0%		-	0%	0%	0%	0%		-	-	-	
Bicycles	0	1	0	0		-	0	0	0	0		-	0	1	0	0		-	1	1	0	0		-	-	-	
Bicycle %	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	1.4%	4.3%	0%	0%		-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)

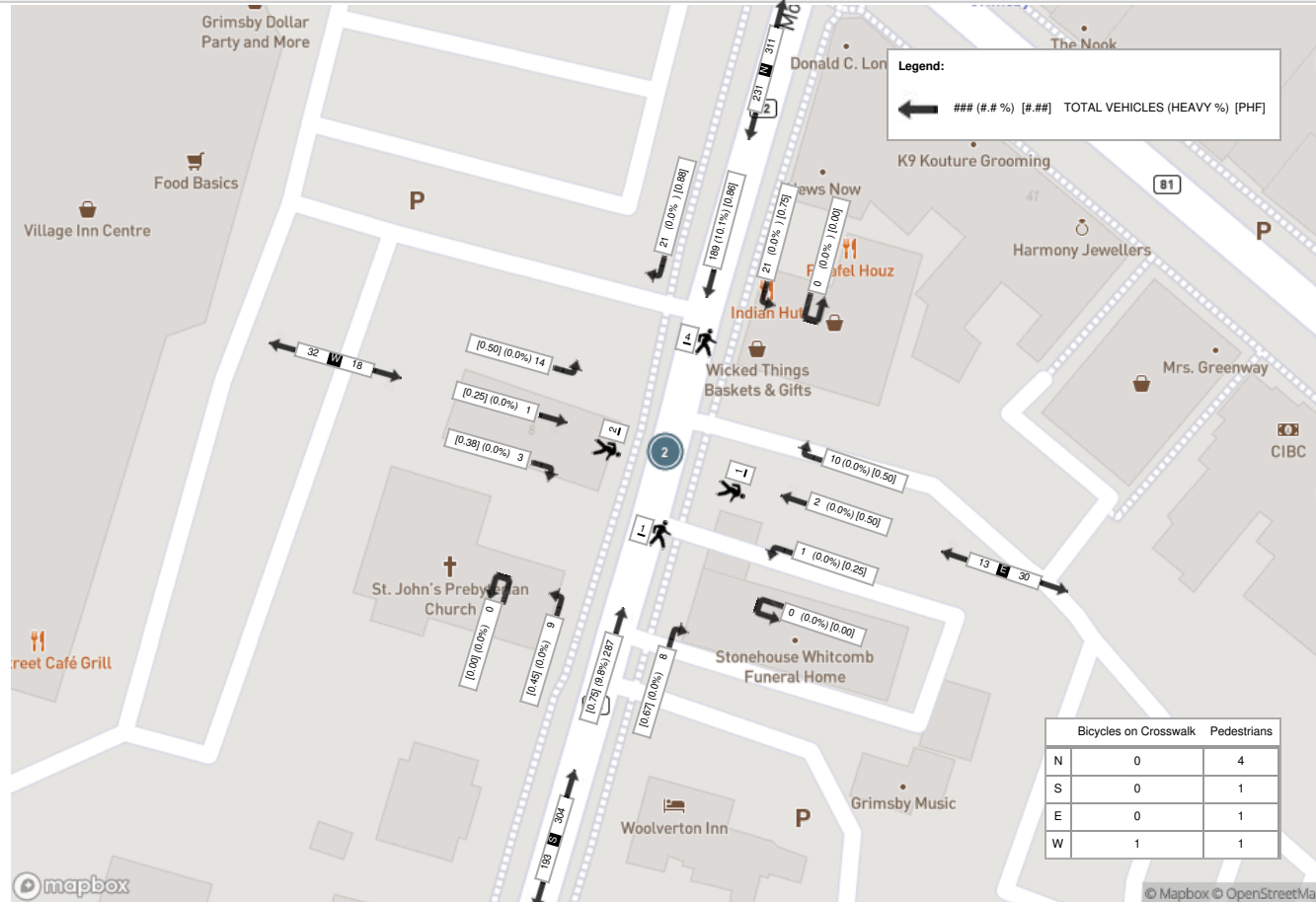
Start Time	N Approach MOUNTAIN ST						E Approach BALSAM LN						S Approach MOUNTAIN ST						W Approach WEST DRIVEWAY						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	4	37	4	0	0	45	1	0	1	0	0	2	1	59	5	0	1	65	2	0	1	0	0	3	115
08:15:00	6	47	5	0	1	58	2	1	0	0	0	3	3	71	1	0	0	75	1	1	2	0	0	4	140
08:30:00	5	50	7	0	1	62	5	1	0	0	1	6	1	61	1	0	0	63	0	0	7	0	0	7	138
08:45:00	6	55	5	0	2	66	2	0	0	0	0	2	3	96	2	0	0	101	0	0	4	0	2	4	173
Grand Total	21	189	21	0	4	231	10	2	1	0	1	13	8	287	9	0	1	304	3	1	14	0	2	18	566
Approach%	9.1%	81.8%	9.1%	0%		-	76.9%	15.4%	7.7%	0%		-	2.6%	94.4%	3%	0%		-	16.7%	5.6%	77.8%	0%		-	-
Totals %	3.7%	33.4%	3.7%	0%		40.8%	1.8%	0.4%	0.2%	0%		2.3%	1.4%	50.7%	1.6%	0%		53.7%	0.5%	0.2%	2.5%	0%		3.2%	-
PHF	0.88	0.86	0.75	0		0.88	0.5	0.5	0.25	0		0.54	0.67	0.75	0.45	0		0.75	0.38	0.25	0.5	0		0.64	-
Heavy	0	19	0	0		19	0	0	0	0		0	0	28	0	0		28	0	0	0	0		0	-
Heavy %	0%	10.1%	0%	0%		8.2%	0%	0%	0%	0%		0%	0%	9.8%	0%	0%		9.2%	0%	0%	0%	0%		0%	-
Lights	21	170	21	0		212	10	2	1	0		13	8	259	9	0		276	3	1	14	0		18	-
Lights %	100%	89.9%	100%	0%		91.8%	100%	100%	100%	0%		100%	100%	90.2%	100%	0%		90.8%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	13	0	0		13	0	0	0	0		0	0	14	0	0		14	0	0	0	0		0	-
Single-Unit Trucks %	0%	6.9%	0%	0%		5.6%	0%	0%	0%	0%		0%	0%	4.9%	0%	0%		4.6%	0%	0%	0%	0%		0%	-
Buses	0	3	0	0		3	0	0	0	0		0	0	6	0	0		6	0	0	0	0		0	-
Buses %	0%	1.6%	0%	0%		1.3%	0%	0%	0%	0%		0%	0%	2.1%	0%	0%		2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	3	0	0		3	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	-
Articulated Trucks %	0%	1.6%	0%	0%		1.3%	0%	0%	0%	0%		0%	0%	2.8%	0%	0%		2.6%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	1		-	-	-	-	-	1	-	-	-	-	1		-	-
Pedestrians%	-	-	-	-	50%	-	-	-	-	12.5%		-	-	-	-	-	12.5%	-	-	-	-	12.5%		-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%		-	-	-	-	-	0%	-	-	-	-	0%		-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0		-	-	-	-	-	0	-	-	-	-	1		-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%		-	-	-	-	-	0%	-	-	-	-	12.5%		-	-



Peak Hour: 04:15 PM - 05:15 PM Weather: Scattered Clouds (22.02 °C)

Start Time	N Approach MOUNTAIN ST						E Approach BALSAM LN						S Approach MOUNTAIN ST						W Approach WEST DRIVEWAY						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	10	85	10	0	8	105	18	5	1	0	0	24	8	97	3	0	2	108	9	3	8	0	2	20	257
16:30:00	9	83	17	0	0	109	19	5	1	0	1	25	7	84	5	0	1	96	12	3	7	0	0	22	252
16:45:00	12	77	24	0	6	113	15	5	2	0	0	22	5	93	3	0	1	101	6	7	7	0	1	20	256
17:00:00	13	90	8	0	1	111	17	4	7	0	0	28	4	73	6	0	0	83	6	2	5	0	0	13	235
Grand Total	44	335	59	0	15	438	69	19	11	0	1	99	24	347	17	0	4	388	33	15	27	0	3	75	1000
Approach%	10%	76.5%	13.5%	0%		-	69.7%	19.2%	11.1%	0%		-	6.2%	89.4%	4.4%	0%		-	44%	20%	36%	0%		-	-
Totals %	4.4%	33.5%	5.9%	0%		43.8%	6.9%	1.9%	1.1%	0%		9.9%	2.4%	34.7%	1.7%	0%		38.8%	3.3%	1.5%	2.7%	0%		7.5%	-
PHF	0.85	0.93	0.61	0		0.97	0.91	0.95	0.39	0		0.88	0.75	0.89	0.71	0		0.9	0.69	0.54	0.84	0		0.85	-
Heavy	0	10	0	0		10	0	0	0	0		0	0	19	0	0		19	0	0	0	0		0	-
Heavy %	0%	3%	0%	0%		2.3%	0%	0%	0%	0%		0%	0%	5.5%	0%	0%		4.9%	0%	0%	0%	0%		0%	-
Lights	44	325	59	0		428	69	19	11	0		99	24	328	17	0		369	33	15	27	0		75	-
Lights %	100%	97%	100%	0%		97.7%	100%	100%	100%	0%		100%	100%	94.5%	100%	0%		95.1%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	4	0	0		4	0	0	0	0		0	0	7	0	0		7	0	0	0	0		0	-
Single-Unit Trucks %	0%	1.2%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.8%	0%	0%	0%	0%		0%	-
Buses	0	2	0	0		2	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	-
Buses %	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		1%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	4	0	0		4	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	-
Articulated Trucks %	0%	1.2%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	2.3%	0%	0%		2.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	15	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	65.2%	-	-	-	-	-	4.3%	-	-	-	-	-	17.4%	-	-	-	-	-	13%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Scattered Clouds (22.02 °C)





Turning Movement Count (3 . MOUNTAIN ST & N SITE DRIVEWAY)

Start Time	N Approach MOUNTAIN ST						E Approach N SITE DRIVEWAY						S Approach MOUNTAIN ST						W Approach WEST DRIVEWAY						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	0	20	0	0	0	20	0	0	0	0	0	0	0	51	0	0	0	51	1	0	0	0	5	1	72		
07:15:00	0	31	0	0	0	31	0	0	0	0	0	0	0	60	0	0	0	60	0	0	0	0	1	0	91		
07:30:00	0	28	0	0	0	28	0	0	0	0	2	0	0	56	0	0	0	56	0	0	0	0	1	0	84		
07:45:00	0	45	1	0	0	46	0	0	1	0	0	1	1	79	1	0	0	81	0	0	0	0	1	0	128	375	
08:00:00	0	40	0	0	1	40	1	0	0	0	0	1	0	63	0	0	4	63	0	0	0	0	0	0	104	407	
08:15:00	0	48	0	0	0	48	0	1	0	0	0	1	0	73	0	0	1	73	0	0	0	0	1	0	122	438	
08:30:00	0	51	0	0	0	51	0	0	0	0	1	0	0	101	0	0	0	101	0	0	0	0	0	0	152	506	
08:45:00	0	52	0	0	1	52	0	0	0	0	1	0	0	101	0	0	0	101	0	0	0	0	3	0	153	531	
BREAK																											
16:00:00	0	86	0	0	0	86	0	0	0	0	2	0	0	96	0	0	0	96	0	0	0	0	6	0	182		
16:15:00	0	90	0	0	0	90	0	0	1	0	1	1	0	108	0	0	1	108	0	0	0	0	7	0	199		
16:30:00	0	100	0	0	1	100	0	0	0	0	4	0	0	96	0	0	0	96	0	0	0	0	3	0	196		
16:45:00	0	84	0	0	0	84	1	0	0	0	4	1	0	99	0	0	0	99	0	0	0	0	6	0	184	761	
17:00:00	0	102	0	0	0	102	0	0	0	0	0	0	1	83	1	0	0	85	0	0	0	0	2	0	187	766	
17:15:00	0	94	0	0	0	94	2	0	0	0	2	2	0	92	0	0	0	92	0	0	1	0	0	1	189	756	
17:30:00	0	95	1	0	0	96	1	0	0	0	5	1	0	78	0	0	0	78	0	0	0	0	2	0	175	735	
17:45:00	0	92	0	0	0	92	0	0	0	0	0	0	0	101	0	0	0	101	1	0	0	0	2	1	194	745	
Grand Total	0	1058	2	0	3	1060	5	1	2	0	22	8	2	1337	2	0	6	1341	2	0	1	0	40	3	2412	-	
Approach%	0%	99.8%	0.2%	0%		-	62.5%	12.5%	25%	0%		-	0.1%	99.7%	0.1%	0%		-	66.7%	0%	33.3%	0%		-	-	-	
Totals %	0%	43.9%	0.1%	0%		43.9%	0.2%	0%	0.1%	0%		0.3%	0.1%	55.4%	0.1%	0%		55.6%	0.1%	0%	0%	0%		0.1%	-	-	
Heavy	0	58	0	0		-	0	0	0	0		-	0	82	1	0		-	0	0	1	0		-	-	-	
Heavy %	0%	5.5%	0%	0%		-	0%	0%	0%	0%		-	0%	6.1%	50%	0%		-	0%	0%	100%	0%		-	-	-	
Bicycles	0	0	0	0		-	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	-	-	
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)

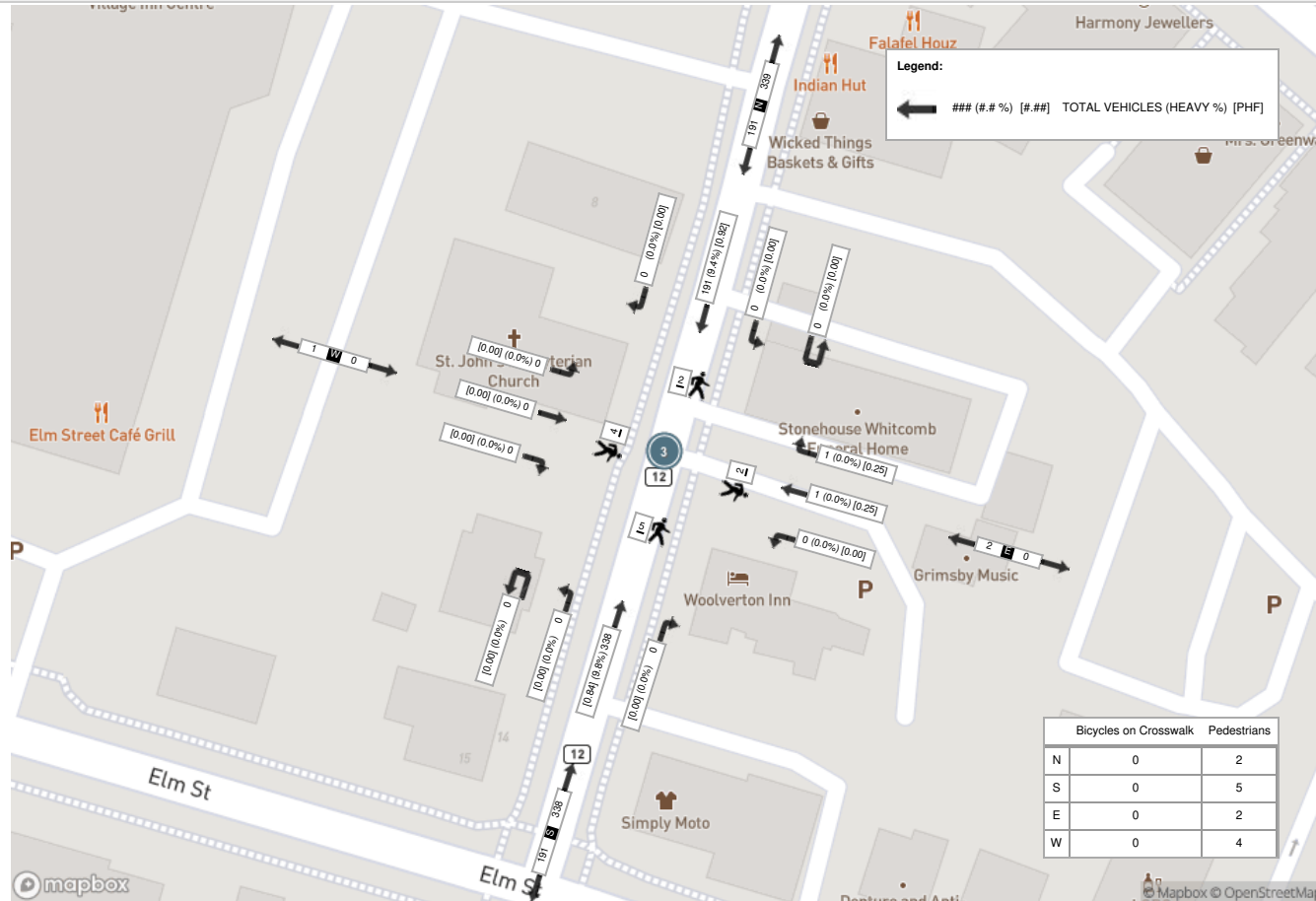
Start Time	N Approach MOUNTAIN ST						E Approach N SITE DRIVEWAY						S Approach MOUNTAIN ST						W Approach WEST DRIVEWAY						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:00:00	0	40	0	0	1	40	1	0	0	0	0	1	0	63	0	0	4	63	0	0	0	0	0	0	104
08:15:00	0	48	0	0	0	48	0	1	0	0	0	1	0	73	0	0	1	73	0	0	0	0	1	0	122
08:30:00	0	51	0	0	0	51	0	0	0	0	1	0	0	101	0	0	0	101	0	0	0	0	0	0	152
08:45:00	0	52	0	0	1	52	0	0	0	0	1	0	0	101	0	0	0	101	0	0	0	0	3	0	153
Grand Total	0	191	0	0	2	191	1	1	0	0	2	2	0	338	0	0	5	338	0	0	0	0	4	0	531
Approach%	0%	100%	0%	0%		-	50%	50%	0%	0%		-	0%	100%	0%	0%		-	0%	0%	0%	0%		-	-
Totals %	0%	36%	0%	0%		36%	0.2%	0.2%	0%	0%		0.4%	0%	63.7%	0%	0%		63.7%	0%	0%	0%	0%		0%	-
PHF	0	0.92	0	0		0.92	0.25	0.25	0	0		0.5	0	0.84	0	0		0.84	0	0	0	0		0	-
Heavy	0	18	0	0		18	0	0	0	0		0	0	33	0	0		33	0	0	0	0		0	-
Heavy %	0%	9.4%	0%	0%		9.4%	0%	0%	0%	0%		0%	0%	9.8%	0%	0%		9.8%	0%	0%	0%	0%		0%	-
Lights	0	173	0	0		173	1	1	0	0		2	0	305	0	0		305	0	0	0	0		0	-
Lights %	0%	90.6%	0%	0%		90.6%	100%	100%	0%	0%		100%	0%	90.2%	0%	0%		90.2%	0%	0%	0%	0%		0%	-
Single-Unit Trucks	0	11	0	0		11	0	0	0	0		0	0	18	0	0		18	0	0	0	0		0	-
Single-Unit Trucks %	0%	5.8%	0%	0%		5.8%	0%	0%	0%	0%		0%	0%	5.3%	0%	0%		5.3%	0%	0%	0%	0%		0%	-
Buses	0	4	0	0		4	0	0	0	0		0	0	10	0	0		10	0	0	0	0		0	-
Buses %	0%	2.1%	0%	0%		2.1%	0%	0%	0%	0%		0%	0%	3%	0%	0%		3%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	3	0	0		3	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	-
Articulated Trucks %	0%	1.6%	0%	0%		1.6%	0%	0%	0%	0%		0%	0%	1.5%	0%	0%		1.5%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	15.4%	-	-	-	-	-	15.4%	-	-	-	-	-	38.5%	-	-	-	-	-	30.8%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



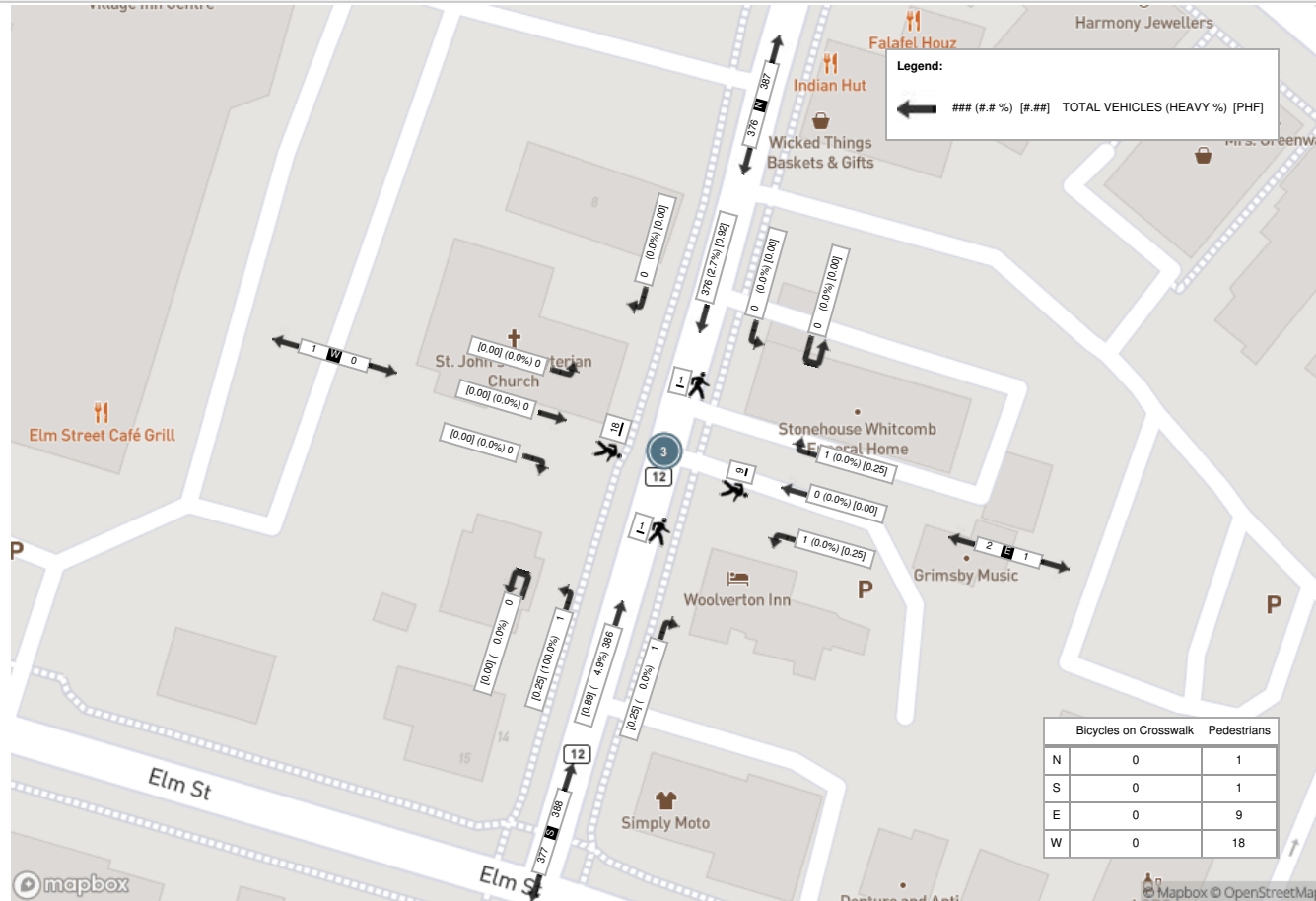
Peak Hour: 04:15 PM - 05:15 PM Weather: Scattered Clouds (22.02 °C)

Start Time	N Approach MOUNTAIN ST						E Approach N SITE DRIVEWAY						S Approach MOUNTAIN ST						W Approach WEST DRIVEWAY						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	0	90	0	0	0	90	0	0	1	0	1	1	0	108	0	0	1	108	0	0	0	0	7	0	199
16:30:00	0	100	0	0	1	100	0	0	0	0	4	0	0	96	0	0	0	96	0	0	0	0	3	0	196
16:45:00	0	84	0	0	0	84	1	0	0	0	4	1	0	99	0	0	0	99	0	0	0	0	6	0	184
17:00:00	0	102	0	0	0	102	0	0	0	0	0	0	1	83	1	0	0	85	0	0	0	0	2	0	187
Grand Total	0	376	0	0	1	376	1	0	1	0	9	2	1	386	1	0	1	388	0	0	0	0	18	0	766
Approach%	0%	100%	0%	0%		-	50%	0%	50%	0%		-	0.3%	99.5%	0.3%	0%		-	0%	0%	0%	0%		-	-
Totals %	0%	49.1%	0%	0%		49.1%	0.1%	0%	0.1%	0%		0.3%	0.1%	50.4%	0.1%	0%		50.7%	0%	0%	0%	0%		0%	-
PHF	0	0.92	0	0		0.92	0.25	0	0.25	0		0.5	0.25	0.89	0.25	0		0.9	0	0	0	0		0	-
Heavy	0	10	0	0		10	0	0	0	0		0	0	19	1	0		20	0	0	0	0		0	-
Heavy %	0%	2.7%	0%	0%		2.7%	0%	0%	0%	0%		0%	0%	4.9%	100%	0%		5.2%	0%	0%	0%	0%		0%	-
Lights	0	366	0	0		366	1	0	1	0		2	1	367	0	0		368	0	0	0	0		0	-
Lights %	0%	97.3%	0%	0%		97.3%	100%	0%	100%	0%		100%	100%	95.1%	0%	0%		94.8%	0%	0%	0%	0%		0%	-
Single-Unit Trucks	0	4	0	0		4	0	0	0	0		0	0	7	1	0		8	0	0	0	0		0	-
Single-Unit Trucks %	0%	1.1%	0%	0%		1.1%	0%	0%	0%	0%		0%	0%	1.8%	100%	0%		2.1%	0%	0%	0%	0%		0%	-
Buses	0	2	0	0		2	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	-
Buses %	0%	0.5%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	1%	0%	0%		1%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	4	0	0		4	0	0	0	0		0	0	8	0	0		8	0	0	0	0		0	-
Articulated Trucks %	0%	1.1%	0%	0%		1.1%	0%	0%	0%	0%		0%	0%	2.1%	0%	0%		2.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	9	-	-	-	-	-	-	1	-	-	-	-	-	18	-	-
Pedestrians%	-	-	-	-	3.4%	-	-	-	-	31%	-	-	-	-	-	-	3.4%	-	-	-	-	-	62.1%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (18.08 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Scattered Clouds (22.02 °C)





Turning Movement Count (1 . SOUTH SERVICE RD & CLARKE ST / CHRISTIE ST) MioID: 1246731

Start Time	N Approach CHRISTIE ST						E Approach CLARKE ST						S Approach CHRISTIE ST						W Approach SOUTH SERVICE RD						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	10	45	2	0	0	57	13	18	4	0	1	35	3	91	3	0	0	97	2	7	7	0	0	16	205		
07:15:00	11	51	3	0	0	65	16	29	10	0	0	55	5	87	5	0	0	97	3	10	12	0	0	25	242		
07:30:00	17	58	5	0	0	80	18	31	4	0	1	53	7	87	8	0	0	102	5	11	13	0	0	29	264		
07:45:00	30	64	10	0	0	104	10	71	13	0	0	94	4	84	12	0	0	100	3	23	22	0	2	48	346	1057	
08:00:00	18	45	3	0	0	66	17	41	8	1	1	67	5	94	14	0	0	113	5	24	12	0	0	41	287	1139	
08:15:00	15	82	6	0	0	103	14	27	12	0	0	53	11	108	8	0	0	127	7	10	22	0	1	39	322	1219	
08:30:00	26	72	8	0	0	106	15	31	11	0	0	57	7	74	5	0	0	86	7	26	23	0	0	56	305	1260	
08:45:00	22	105	4	0	0	131	8	43	30	0	0	81	10	70	15	0	0	95	11	26	26	0	1	63	370	1284	
BREAK																											
16:00:00	19	95	6	0	0	120	10	33	10	0	2	53	11	105	17	0	0	133	26	44	26	0	2	96	402		
16:15:00	16	112	3	0	0	131	8	42	11	0	0	61	9	86	8	0	0	103	24	48	36	0	1	108	403		
16:30:00	19	115	6	0	0	140	10	43	18	0	1	71	15	88	7	0	0	110	22	46	43	0	0	111	432		
16:45:00	17	110	7	0	0	134	3	42	12	0	0	57	11	81	14	0	0	106	23	62	35	0	1	120	417	1654	
17:00:00	18	118	6	0	0	142	9	24	5	0	1	38	7	96	14	0	1	117	19	56	45	0	1	120	417	1669	
17:15:00	14	114	15	0	0	143	6	29	5	0	0	40	13	95	16	0	0	124	26	53	22	0	1	101	408	1674	
17:30:00	15	92	8	0	0	115	5	31	10	0	0	46	6	85	4	0	0	95	23	45	20	0	2	88	344	1586	
17:45:00	15	110	9	0	0	134	5	27	6	0	1	38	9	64	9	0	0	82	10	39	10	0	1	59	313	1482	
Grand Total	282	1388	101	0	0	1771	167	562	169	1	8	899	133	1395	159	0	1	1687	216	530	374	0	13	1120	5477	-	
Approach%	15.9%	78.4%	5.7%	0%		-	18.6%	62.5%	18.8%	0.1%		-	7.9%	82.7%	9.4%	0%		-	19.3%	47.3%	33.4%	0%		-	-	-	
Totals %	5.1%	25.3%	1.8%	0%		32.3%	3%	10.3%	3.1%	0%		16.4%	2.4%	25.5%	2.9%	0%		30.8%	3.9%	9.7%	6.8%	0%		20.4%	-	-	
Heavy	12	66	4	0		-	5	32	12	1		-	11	98	9	0		-	8	13	17	0		-	-	-	
Heavy %	4.3%	4.8%	4%	0%		-	3%	5.7%	7.1%	100%		-	8.3%	7%	5.7%	0%		-	3.7%	2.5%	4.5%	0%		-	-	-	
Bicycles	0	0	0	0		-	0	0	0	0		-	0	1	0	0		-	0	0	0	0		-	-	-	
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	0%	0%	0%	0%		-	-	-	



Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (3.56 °C)

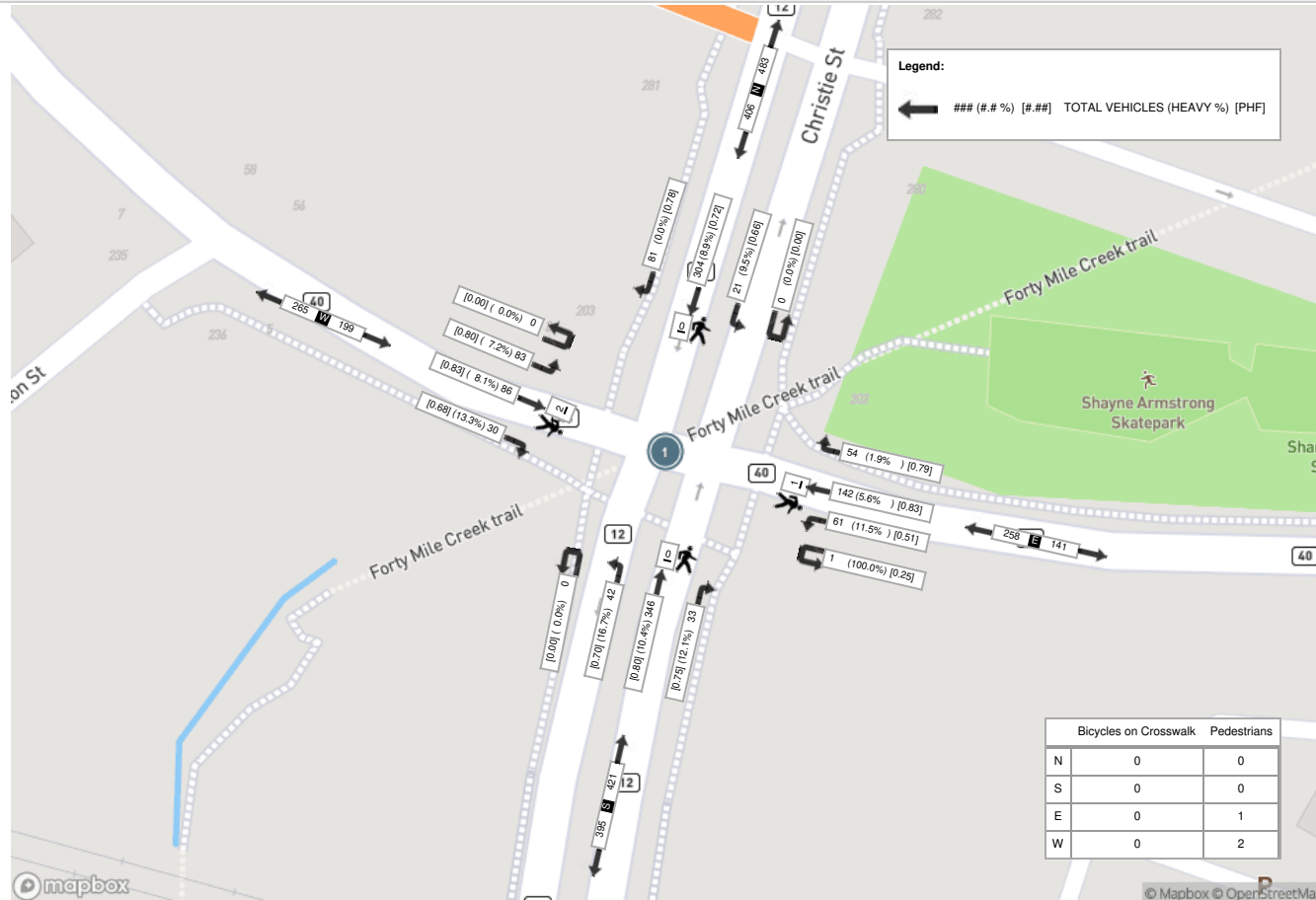
Start Time	N Approach CHRISTIE ST						E Approach CLARKE ST						S Approach CHRISTIE ST						W Approach SOUTH SERVICE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	18	45	3	0	0	66	17	41	8	1	1	67	5	94	14	0	0	113	5	24	12	0	0	41	287
08:15:00	15	82	6	0	0	103	14	27	12	0	0	53	11	108	8	0	0	127	7	10	22	0	1	39	322
08:30:00	26	72	8	0	0	106	15	31	11	0	0	57	7	74	5	0	0	86	7	26	23	0	0	56	305
08:45:00	22	105	4	0	0	131	8	43	30	0	0	81	10	70	15	0	0	95	11	26	26	0	1	63	370
Grand Total	81	304	21	0	0	406	54	142	61	1	1	258	33	346	42	0	0	421	30	86	83	0	2	199	1284
Approach%	20%	74.9%	5.2%	0%		-	20.9%	55%	23.6%	0.4%		-	7.8%	82.2%	10%	0%		-	15.1%	43.2%	41.7%	0%		-	-
Totals %	6.3%	23.7%	1.6%	0%		31.6%	4.2%	11.1%	4.8%	0.1%		20.1%	2.6%	26.9%	3.3%	0%		32.8%	2.3%	6.7%	6.5%	0%		15.5%	-
PHF	0.78	0.72	0.66	0		0.77	0.79	0.83	0.51	0.25		0.8	0.75	0.8	0.7	0		0.83	0.68	0.83	0.8	0		0.79	-
Heavy	0	27	2	0		29	1	8	7	1		17	4	36	7	0		47	4	7	6	0		17	-
Heavy %	0%	8.9%	9.5%	0%		7.1%	1.9%	5.6%	11.5%	100%		6.6%	12.1%	10.4%	16.7%	0%		11.2%	13.3%	8.1%	7.2%	0%		8.5%	-
Lights	81	277	19	0		377	53	134	54	0		241	29	310	35	0		374	26	79	77	0		182	-
Lights %	100%	91.1%	90.5%	0%		92.9%	98.1%	94.4%	88.5%	0%		93.4%	87.9%	89.6%	83.3%	0%		88.8%	86.7%	91.9%	92.8%	0%		91.5%	-
Single-Unit Trucks	0	15	2	0		17	1	3	4	1		9	4	20	5	0		29	4	4	1	0		9	-
Single-Unit Trucks %	0%	4.9%	9.5%	0%		4.2%	1.9%	2.1%	6.6%	100%		3.5%	12.1%	5.8%	11.9%	0%		6.9%	13.3%	4.7%	1.2%	0%		4.5%	-
Buses	0	5	0	0		5	0	3	3	0		6	0	9	2	0		11	0	3	4	0		7	-
Buses %	0%	1.6%	0%	0%		1.2%	0%	2.1%	4.9%	0%		2.3%	0%	2.6%	4.8%	0%		2.6%	0%	3.5%	4.8%	0%		3.5%	-
Articulated Trucks	0	7	0	0		7	0	2	0	0		2	0	7	0	0		7	0	0	1	0		1	-
Articulated Trucks %	0%	2.3%	0%	0%		1.7%	0%	1.4%	0%	0%		0.8%	0%	2%	0%	0%		1.7%	0%	0%	1.2%	0%		0.5%	-
Pedestrians	-	-	-	-	0	-	-	-	-	1		-	-	-	-	-	0	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	33.3%		-	-	-	-	-	0%	-	-	-	-	-	66.7%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%		-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0		-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%		-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



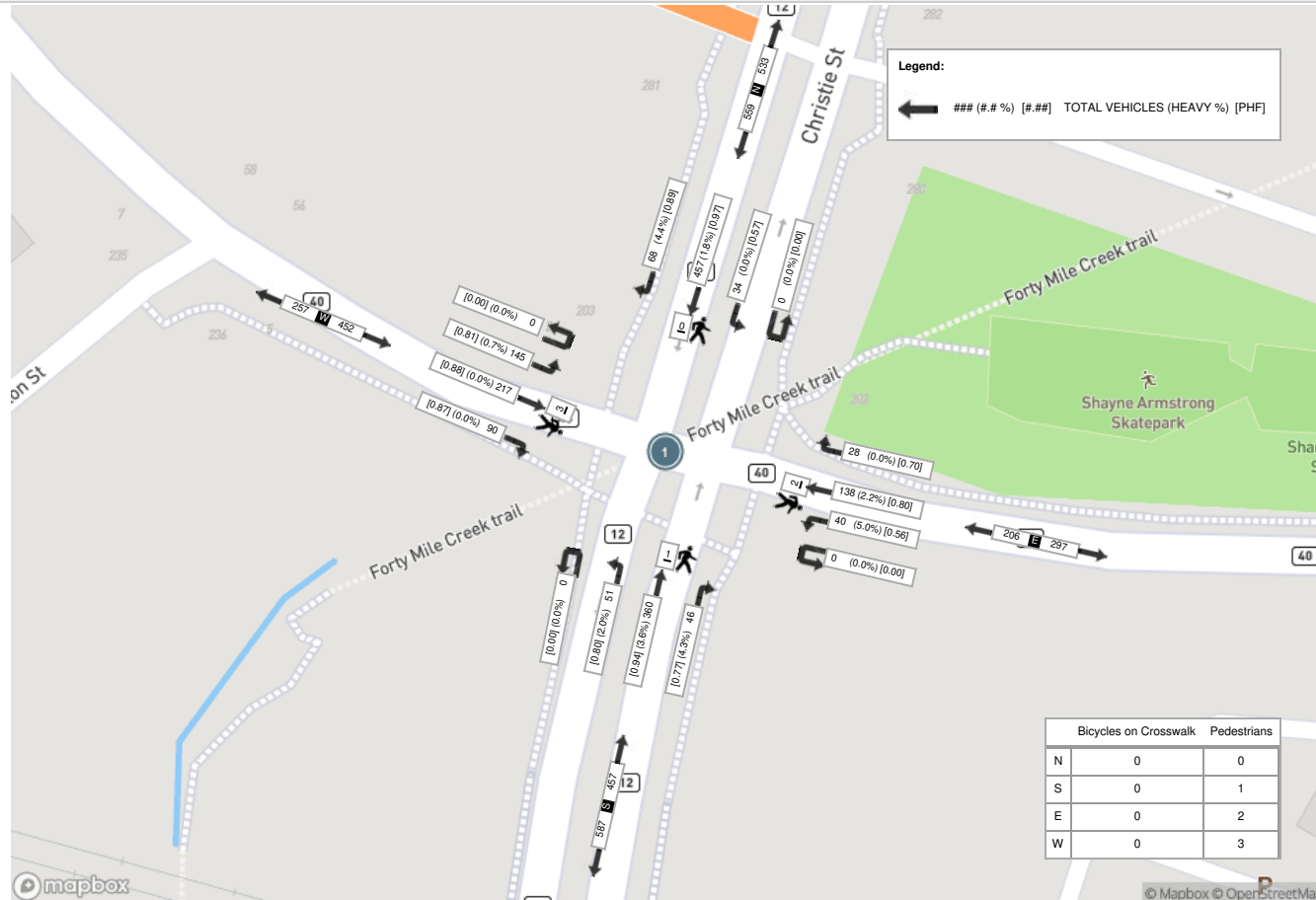
Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (7.2 °C)

Start Time	N Approach CHRISTIE ST						E Approach CLARKE ST						S Approach CHRISTIE ST						W Approach SOUTH SERVICE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	19	115	6	0	0	140	10	43	18	0	1	71	15	88	7	0	0	110	22	46	43	0	0	111	432
16:45:00	17	110	7	0	0	134	3	42	12	0	0	57	11	81	14	0	0	106	23	62	35	0	1	120	417
17:00:00	18	118	6	0	0	142	9	24	5	0	1	38	7	96	14	0	1	117	19	56	45	0	1	120	417
17:15:00	14	114	15	0	0	143	6	29	5	0	0	40	13	95	16	0	0	124	26	53	22	0	1	101	408
Grand Total	68	457	34	0	0	559	28	138	40	0	2	206	46	360	51	0	1	457	90	217	145	0	3	452	1674
Approach%	12.2%	81.8%	6.1%	0%		-	13.6%	67%	19.4%	0%		-	10.1%	78.8%	11.2%	0%		-	19.9%	48%	32.1%	0%		-	-
Totals %	4.1%	27.3%	2%	0%		33.4%	1.7%	8.2%	2.4%	0%		12.3%	2.7%	21.5%	3%	0%		27.3%	5.4%	13%	8.7%	0%		27%	-
PHF	0.89	0.97	0.57	0		0.98	0.7	0.8	0.56	0		0.73	0.77	0.94	0.8	0		0.92	0.87	0.88	0.81	0		0.94	-
Heavy	3	8	0	0		11	0	3	2	0		5	2	13	1	0		16	0	0	1	0		1	-
Heavy %	4.4%	1.8%	0%	0%		2%	0%	2.2%	5%	0%		2.4%	4.3%	3.6%	2%	0%		3.5%	0%	0%	0.7%	0%		0.2%	-
Lights	65	449	34	0		548	28	135	38	0		201	44	347	50	0		441	90	217	144	0		451	-
Lights %	95.6%	98.2%	100%	0%		98%	100%	97.8%	95%	0%		97.6%	95.7%	96.4%	98%	0%		96.5%	100%	100%	99.3%	0%		99.8%	-
Single-Unit Trucks	3	7	0	0		10	0	2	2	0		4	2	5	0	0		7	0	0	1	0		1	-
Single-Unit Trucks %	4.4%	1.5%	0%	0%		1.8%	0%	1.4%	5%	0%		1.9%	4.3%	1.4%	0%	0%		1.5%	0%	0%	0.7%	0%		0.2%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	1	0	0		1	0	1	0	0		1	0	7	1	0		8	0	0	0	0		0	-
Articulated Trucks %	0%	0.2%	0%	0%		0.2%	0%	0.7%	0%	0%		0.5%	0%	1.9%	2%	0%		1.8%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	33.3%	-	-	-	-	-	16.7%	-	-	-	-	-	50%	-	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Scattered Clouds (3.56 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (7.2 °C)





Turning Movement Count (1 . MOUNTAIN ST & ELM ST)

Start Time	N Approach MOUNTAIN ST (CHRISTIE ST RR12)						E Approach ELM ST						S Approach MOUNTAIN ST (CHRISTIE ST RR12)						W Approach ELM ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	2	22	0	0	1	24	1	17	7	0	0	25	5	43	11	0	1	59	5	5	3	0	0	13	121		
07:15:00	2	21	0	0	0	23	1	16	8	0	2	25	11	66	14	0	1	91	8	13	4	0	0	25	164		
07:30:00	7	36	0	0	0	43	0	23	11	0	1	34	10	53	20	0	0	83	7	17	2	0	0	26	186		
07:45:00	5	34	1	0	2	40	1	38	19	0	0	58	5	57	30	0	0	92	9	29	5	0	0	43	233	704	
08:00:00	1	34	0	0	1	35	0	23	11	0	2	34	13	48	10	0	0	71	19	21	2	0	0	42	182	765	
08:15:00	3	36	2	0	0	41	0	30	8	0	0	38	11	61	8	0	0	80	8	26	10	0	1	44	203	804	
08:30:00	1	33	2	0	3	36	1	31	6	0	1	38	15	76	10	0	0	101	6	42	6	0	0	54	229	847	
08:45:00	8	34	0	0	1	42	1	23	5	0	0	29	13	73	13	0	0	99	10	44	10	0	0	64	234	848	
09:00:00	5	29	2	0	3	36	0	33	17	0	0	50	18	59	14	0	2	91	13	32	6	0	0	51	228	894	
09:15:00	5	41	2	0	0	48	3	28	11	0	0	42	11	42	14	0	0	67	9	26	8	0	0	43	200	891	
09:30:00	6	34	0	0	1	40	3	30	12	0	0	45	16	51	11	0	2	78	12	31	8	0	2	51	214	876	
09:45:00	13	35	10	0	2	58	0	41	9	0	1	50	18	44	13	0	1	75	12	27	7	0	1	46	229	871	
BREAK																											
16:00:00	1	77	8	0	6	86	1	49	22	0	2	72	20	55	9	0	1	84	33	59	9	0	3	101	343		
16:15:00	9	68	6	0	1	83	3	46	21	0	0	70	15	56	14	0	1	85	29	48	12	0	0	89	327		
16:30:00	6	74	5	0	1	85	3	47	19	0	1	69	14	64	20	0	0	98	26	54	7	0	1	87	339		
16:45:00	4	63	5	0	1	72	6	29	16	0	1	51	8	51	11	0	0	70	19	74	10	0	1	103	296	1305	
17:00:00	7	60	7	0	1	74	3	43	12	0	1	58	6	68	9	0	1	83	26	55	6	0	1	87	302	1264	
17:15:00	7	74	5	0	0	86	2	39	14	0	1	55	15	61	7	0	0	83	18	44	7	0	0	69	293	1230	
17:30:00	4	84	3	0	1	91	3	26	23	0	3	52	14	46	14	0	1	74	24	47	11	0	3	82	299	1190	
17:45:00	2	59	2	0	6	63	2	38	15	0	0	55	10	44	12	0	0	66	13	41	8	0	0	62	246	1140	
18:00:00	4	55	5	0	1	64	1	22	16	0	1	39	5	35	12	0	0	52	20	31	8	0	3	59	214	1052	
18:15:00	11	52	4	0	5	67	1	37	12	0	0	50	5	43	10	0	0	58	15	35	10	0	0	60	235	994	
18:30:00	5	66	2	0	2	73	1	22	10	0	1	33	13	33	13	0	0	59	18	33	2	0	0	53	218	913	
18:45:00	4	34	7	0	1	45	5	17	8	0	0	30	14	35	4	0	1	53	16	24	4	0	0	44	172	839	
Grand Total	122	1155	78	0	40	1355	42	748	312	0	18	1102	285	1264	303	0	12	1852	375	858	165	0	16	1398	5707	-	
Approach%	9%	85.2%	5.8%	0%		-	3.8%	67.9%	28.3%	0%		-	15.4%	68.3%	16.4%	0%		-	26.8%	61.4%	11.8%	0%		-	-	-	
Totals %	2.1%	20.2%	1.4%	0%		23.7%	0.7%	13.1%	5.5%	0%		19.3%	5%	22.1%	5.3%	0%		32.5%	6.6%	15%	2.9%	0%		24.5%	-	-	
Heavy	1	104	0	0		-	0	14	6	0		-	9	118	24	0		-	27	10	9	0		-	-	-	
Heavy %	0.8%	9%	0%	0%		-	0%	1.9%	1.9%	0%		-	3.2%	9.3%	7.9%	0%		-	7.2%	1.2%	5.5%	0%		-	-	-	
Bicycles	2	1	0	0		-	0	3	0	0		-	1	0	0	0		-	1	1	0	0		-	-	-	
Bicycle %	1.6%	0.1%	0%	0%		-	0%	0.4%	0%	0%		-	0.4%	0%	0%	0%		-	0.3%	0.1%	0%	0%		-	-	-	



Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (14.31 °C)

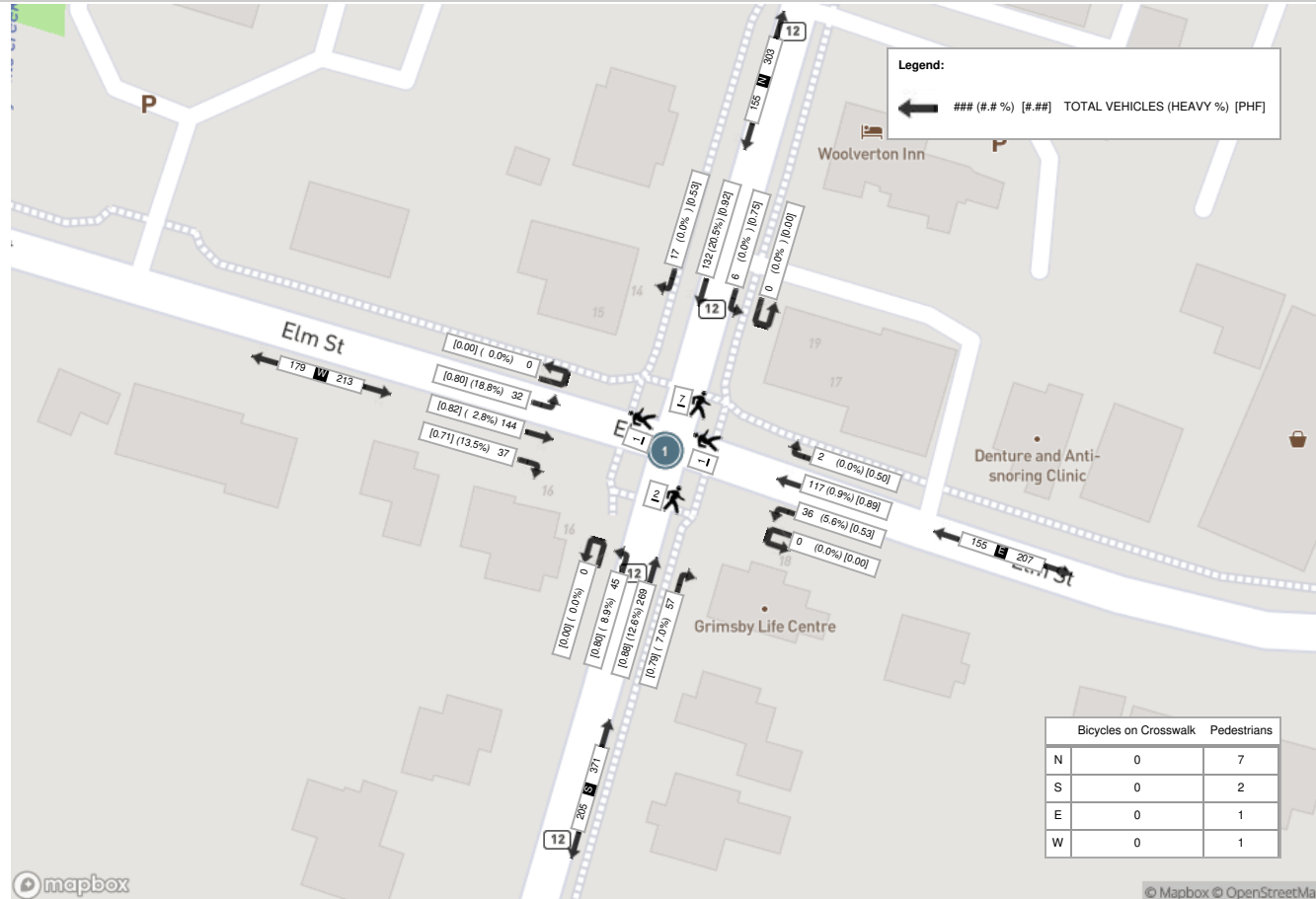
Start Time	N Approach MOUNTAIN ST (CHRISTIE ST RR12)						E Approach ELM ST						S Approach MOUNTAIN ST (CHRISTIE ST RR12)						W Approach ELM ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	3	36	2	0	0	41	0	30	8	0	0	38	11	61	8	0	0	80	8	26	10	0	1	44	203
08:30:00	1	33	2	0	3	36	1	31	6	0	1	38	15	76	10	0	0	101	6	42	6	0	0	54	229
08:45:00	8	34	0	0	1	42	1	23	5	0	0	29	13	73	13	0	0	99	10	44	10	0	0	64	234
09:00:00	5	29	2	0	3	36	0	33	17	0	0	50	18	59	14	0	2	91	13	32	6	0	0	51	228
Grand Total	17	132	6	0	7	155	2	117	36	0	1	155	57	269	45	0	2	371	37	144	32	0	1	213	894
Approach%	11%	85.2%	3.9%	0%		-	1.3%	75.5%	23.2%	0%		-	15.4%	72.5%	12.1%	0%		-	17.4%	67.6%	15%	0%		-	-
Totals %	1.9%	14.8%	0.7%	0%		17.3%	0.2%	13.1%	4%	0%		17.3%	6.4%	30.1%	5%	0%		41.5%	4.1%	16.1%	3.6%	0%		23.8%	-
PHF	0.53	0.92	0.75	0		0.92	0.5	0.89	0.53	0		0.78	0.79	0.88	0.8	0		0.92	0.71	0.82	0.8	0		0.83	-
Heavy	0	27	0	0		27	0	1	2	0		3	4	34	4	0		42	5	4	6	0		15	-
Heavy %	0%	20.5%	0%	0%		17.4%	0%	0.9%	5.6%	0%		1.9%	7%	12.6%	8.9%	0%		11.3%	13.5%	2.8%	18.8%	0%		7%	-
Lights	17	105	6	0		128	2	116	34	0		152	53	235	41	0		329	32	140	26	0		198	-
Lights %	100%	79.5%	100%	0%		82.6%	100%	99.1%	94.4%	0%		98.1%	93%	87.4%	91.1%	0%		88.7%	86.5%	97.2%	81.3%	0%		93%	-
Single-Unit Trucks	0	15	0	0		15	0	1	2	0		3	0	18	4	0		22	3	4	3	0		10	-
Single-Unit Trucks %	0%	11.4%	0%	0%		9.7%	0%	0.9%	5.6%	0%		1.9%	0%	6.7%	8.9%	0%		5.9%	8.1%	2.8%	9.4%	0%		4.7%	-
Buses	0	4	0	0		4	0	0	0	0		0	4	9	0	0		13	1	0	2	0		3	-
Buses %	0%	3%	0%	0%		2.6%	0%	0%	0%	0%		0%	7%	3.3%	0%	0%		3.5%	2.7%	0%	6.3%	0%		1.4%	-
Articulated Trucks	0	8	0	0		8	0	0	0	0		0	0	7	0	0		7	1	0	1	0		2	-
Articulated Trucks %	0%	6.1%	0%	0%		5.2%	0%	0%	0%	0%		0%	0%	2.6%	0%	0%		1.9%	2.7%	0%	3.1%	0%		0.9%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	63.6%	-	-	-	-	-	9.1%	-	-	-	-	-	18.2%	-	-	-	-	-	9.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



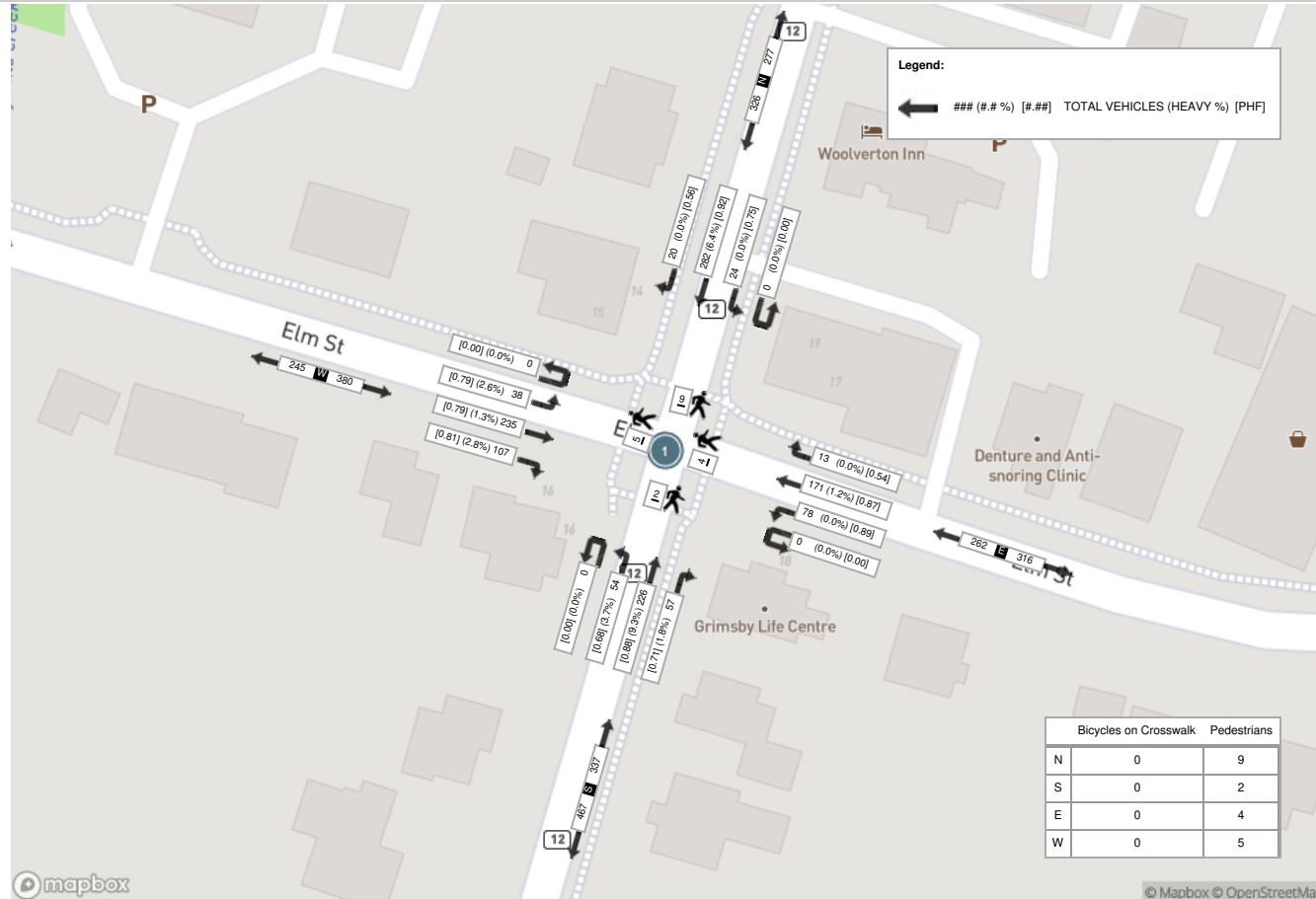
Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (19.01 °C)

Start Time	N Approach MOUNTAIN ST (CHRISTIE ST RR12)						E Approach ELM ST						S Approach MOUNTAIN ST (CHRISTIE ST RR12)						W Approach ELM ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	1	77	8	0	6	86	1	49	22	0	2	72	20	55	9	0	1	84	33	59	9	0	3	101	343
16:15:00	9	68	6	0	1	83	3	46	21	0	0	70	15	56	14	0	1	85	29	48	12	0	0	89	327
16:30:00	6	74	5	0	1	85	3	47	19	0	1	69	14	64	20	0	0	98	26	54	7	0	1	87	339
16:45:00	4	63	5	0	1	72	6	29	16	0	1	51	8	51	11	0	0	70	19	74	10	0	1	103	296
Grand Total	20	282	24	0	9	326	13	171	78	0	4	262	57	226	54	0	2	337	107	235	38	0	5	380	1305
Approach%	6.1%	86.5%	7.4%	0%		-	5%	65.3%	29.8%	0%		-	16.9%	67.1%	16%	0%		-	28.2%	61.8%	10%	0%		-	-
Totals %	1.5%	21.6%	1.8%	0%		25%	1%	13.1%	6%	0%		20.1%	4.4%	17.3%	4.1%	0%		25.8%	8.2%	18%	2.9%	0%		29.1%	-
PHF	0.56	0.92	0.75	0		0.95	0.54	0.87	0.89	0		0.91	0.71	0.88	0.68	0		0.86	0.81	0.79	0.79	0		0.92	-
Heavy	0	18	0	0		18	0	2	0	0		2	1	21	2	0		24	3	3	1	0		7	-
Heavy %	0%	6.4%	0%	0%		5.5%	0%	1.2%	0%	0%		0.8%	1.8%	9.3%	3.7%	0%		7.1%	2.8%	1.3%	2.6%	0%		1.8%	-
Lights	20	264	24	0		308	13	169	78	0		260	56	205	52	0		313	104	232	37	0		373	-
Lights %	100%	93.6%	100%	0%		94.5%	100%	98.8%	100%	0%		99.2%	98.2%	90.7%	96.3%	0%		92.9%	97.2%	98.7%	97.4%	0%		98.2%	-
Single-Unit Trucks	0	14	0	0		14	0	0	0	0		0	0	14	1	0		15	2	1	0	0		3	-
Single-Unit Trucks %	0%	5%	0%	0%		4.3%	0%	0%	0%	0%		0%	0%	6.2%	1.9%	0%		4.5%	1.9%	0.4%	0%	0%		0.8%	-
Buses	0	1	0	0		1	0	1	0	0		1	1	3	1	0		5	1	2	1	0		4	-
Buses %	0%	0.4%	0%	0%		0.3%	0%	0.6%	0%	0%		0.4%	1.8%	1.3%	1.9%	0%		1.5%	0.9%	0.9%	2.6%	0%		1.1%	-
Articulated Trucks	0	3	0	0		3	0	1	0	0		1	0	4	0	0		4	0	0	0	0		0	-
Articulated Trucks %	0%	1.1%	0%	0%		0.9%	0%	0.6%	0%	0%		0.4%	0%	1.8%	0%	0%		1.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	45%	-	-	-	-	-	20%	-	-	-	-	-	10%	-	-	-	-	-	25%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (14.31 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (19.01 °C)



Turning Movements Report - AM Period

Location..... Christie Street/Mountain Street @ Main Street **GeoID.....** 01115

Municipality. GRIMSBY

Count Date. Tuesday, 09 April, 2019

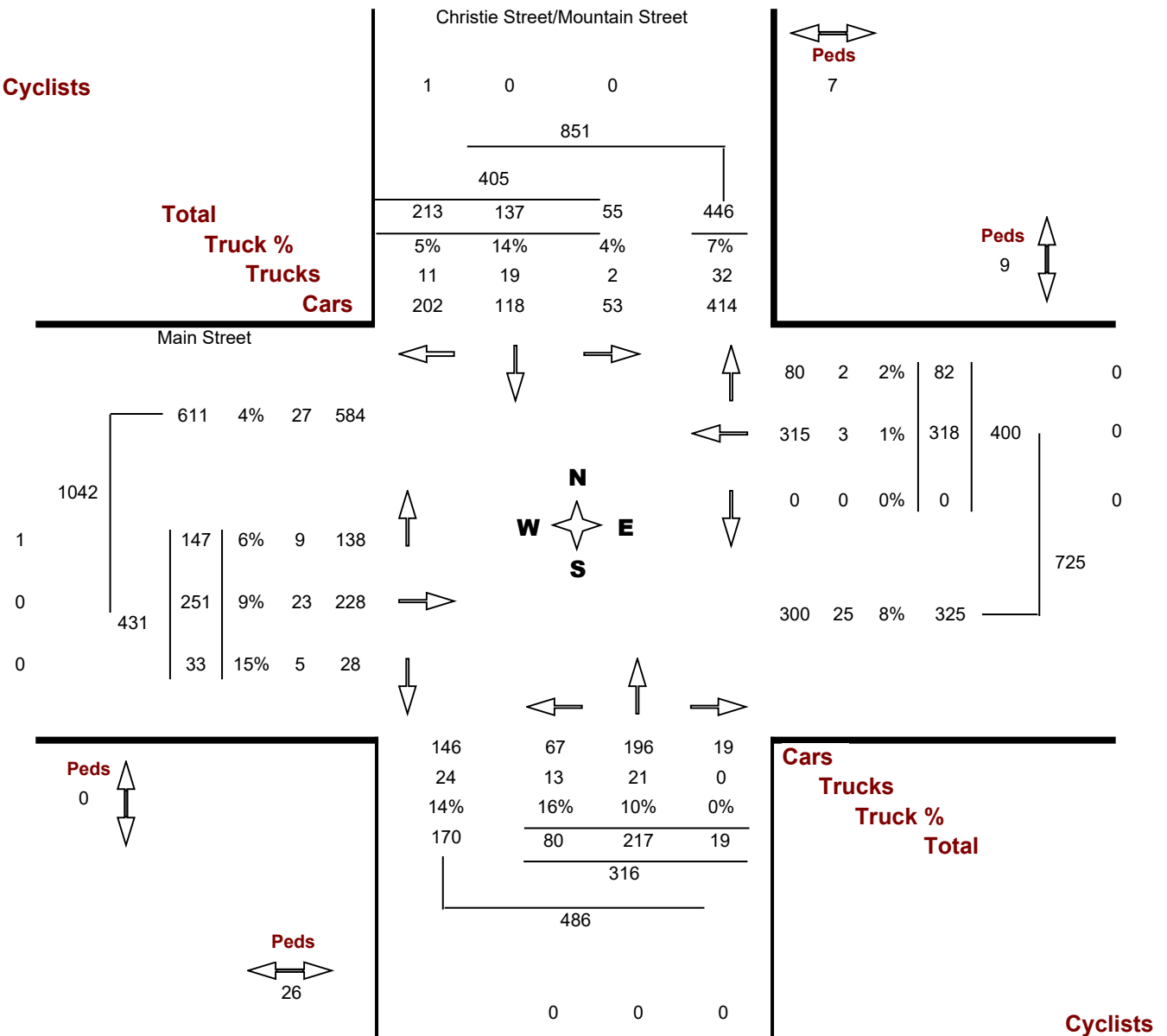
Traffic Cont.

Count Time. 07:00 AM — 09:00 AM

Major Dir..... East west

Peak Hour.. 08:00 AM — 09:00 AM

Cyclists



Turning Movements Report - PM Period

Location..... Christie Street/Mountain Street @ Main Street **GeoID.....** 01115

Municipality. GRIMSBY

Count Date. Tuesday, 09 April, 2019

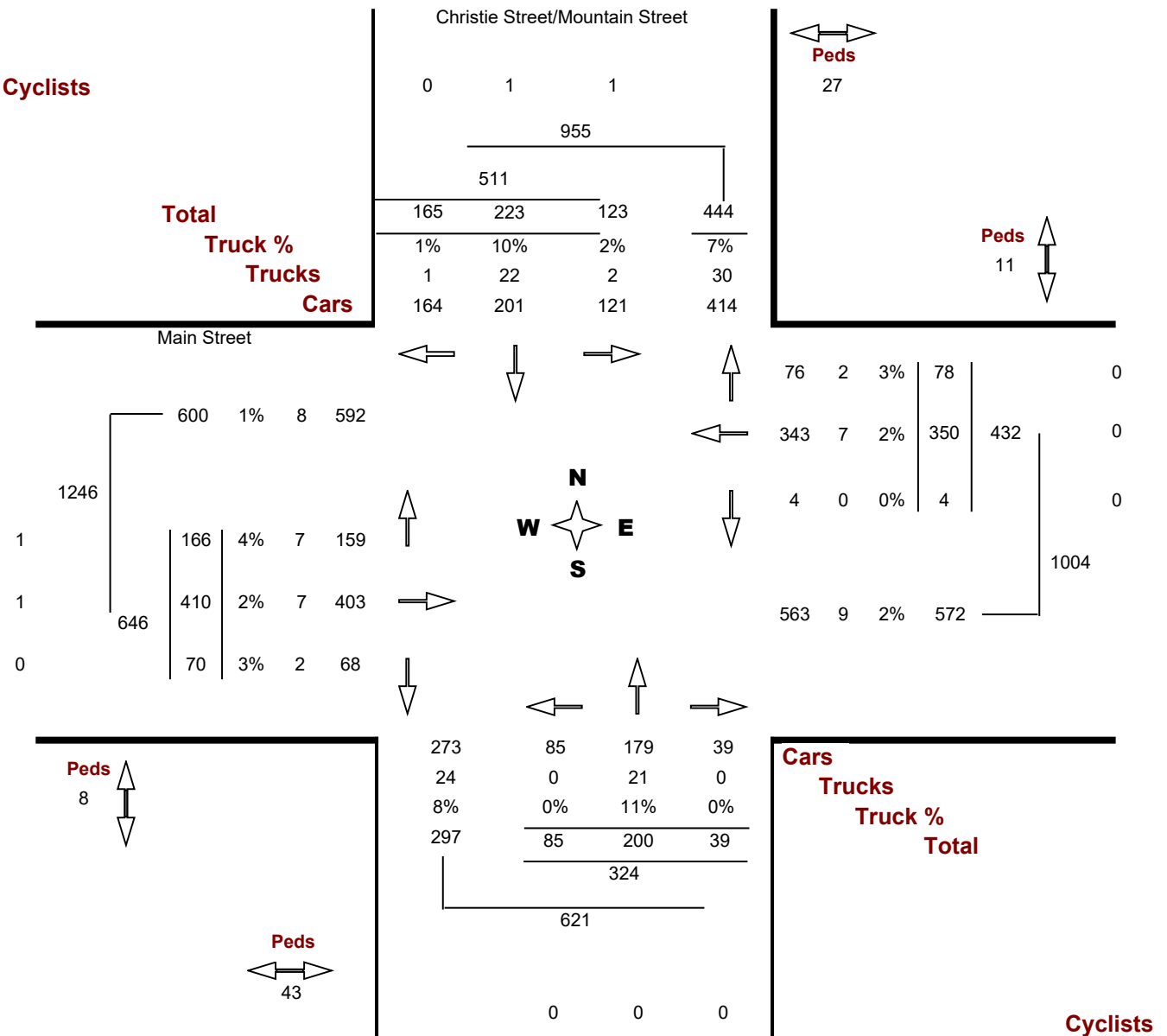
Traffic Cont.

Count Time. 03:00 PM — 06:00 PM

Major Dir..... East west

Peak Hour.. 03:15 PM — 04:15 PM

Cyclists



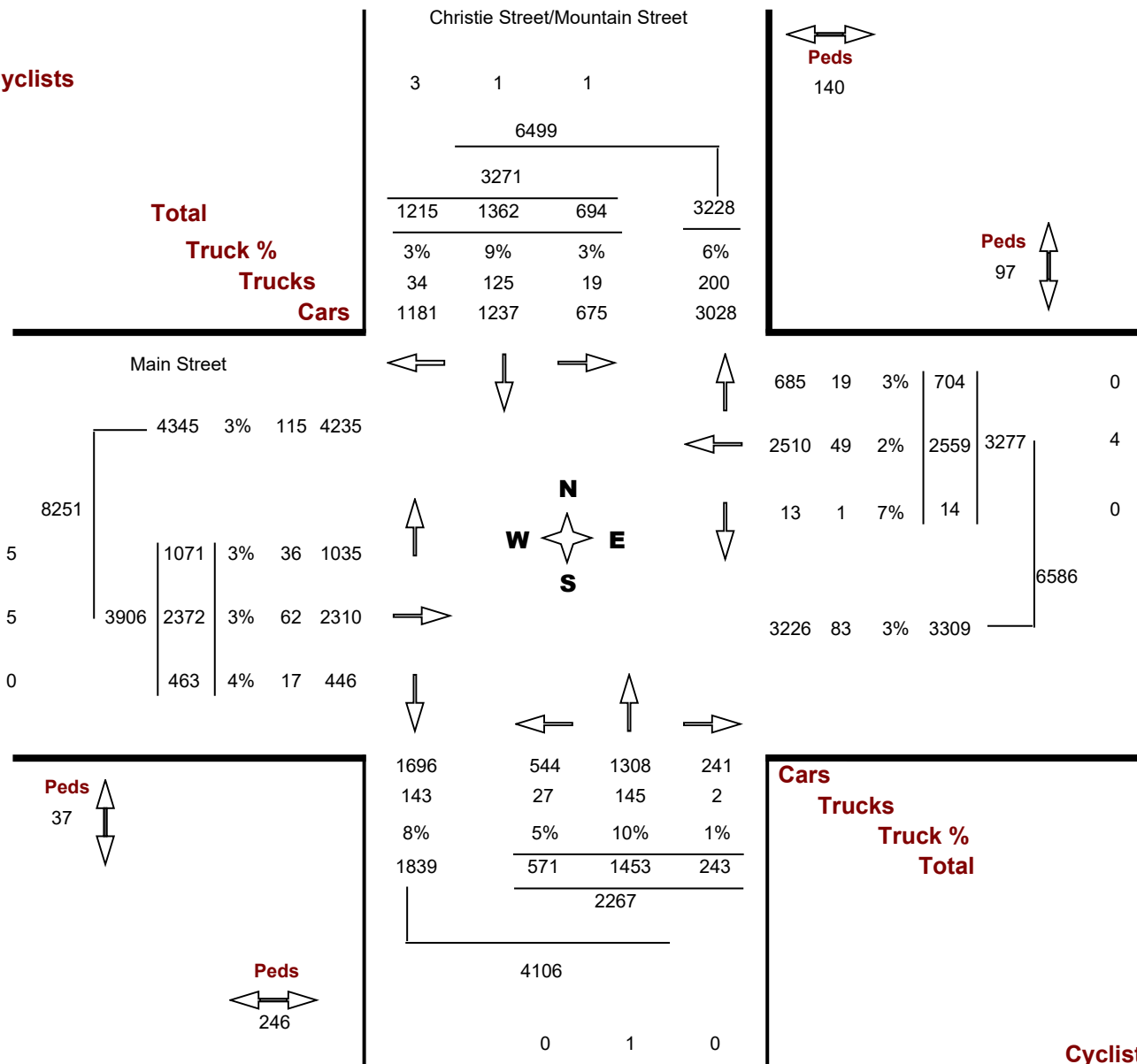
Location..... Christie Street/Mountain Street @ Main Street

Municipality..... GRIMSBY

GeolD..... 01115

Count Date..... Tuesday, 09 April, 2019

Cyclists



Turning Movement Count - Details Report (15 min)

Location..... Christie Street/Mountain Street @ Main Street

Municipality..... GRIMSBY

Count Date..... Tuesday, April 09, 2019

Christie Street/Mountain Street

Main Street

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00 07:15	5	23	18	0	46	16	52	2	0	70	0	37	38	0	75	12	19	6	0	37
07:15 07:30	7	28	23	0	58	12	53	0	0	65	0	28	29	0	57	25	32	8	0	65
07:30 07:45	9	19	23	0	51	17	51	4	0	72	0	62	32	0	94	23	33	10	0	66
07:45 08:00	14	36	41	0	91	32	46	1	0	79	0	85	31	0	116	34	65	17	0	116
Hourly Total	35	106	105	0	246	77	202	7	0	286	0	212	130	0	342	94	149	41	0	284
08:00 08:15	12	31	43	0	86	13	55	5	0	73	0	66	27	0	93	35	60	7	0	102
08:15 08:30	8	29	46	0	83	19	56	5	0	80	0	78	22	0	100	29	60	4	0	93
08:30 08:45	16	34	49	0	99	25	53	3	0	81	0	70	17	0	87	33	50	13	0	96
08:45 09:00	19	43	75	0	137	23	53	6	0	82	0	104	16	0	120	50	81	9	0	140
Hourly Total	55	137	213	0	405	80	217	19	0	316	0	318	82	0	400	147	251	33	0	431
11:00 11:15	18	46	33	0	97	27	46	5	0	78	0	69	21	0	90	28	70	8	0	106
11:15 11:30	21	34	33	0	88	16	33	9	0	58	0	89	17	0	106	32	69	16	0	117
11:30 11:45	23	32	33	0	88	11	39	7	0	57	2	63	21	0	86	30	68	12	0	110
11:45 12:00	19	28	41	0	88	25	39	6	0	70	0	96	21	0	117	31	72	12	0	115
Hourly Total	81	140	140	0	361	79	157	27	0	263	2	317	80	0	399	121	279	48	0	448
12:00 12:15	25	34	47	0	106	17	41	11	0	69	1	80	19	0	100	31	91	12	0	134
12:15 12:30	30	38	31	0	99	18	44	13	0	75	1	92	24	0	117	38	70	16	0	124
12:30 12:45	23	33	35	0	91	12	39	8	0	59	0	82	21	0	103	24	91	17	0	132
12:45 13:00	26	34	39	0	99	15	37	8	0	60	0	82	33	0	115	26	67	12	0	105
Hourly Total	104	139	152	0	395	62	161	40	0	263	2	336	97	0	435	119	319	57	0	495
13:00 13:15	21	33	42	0	96	23	30	12	0	65	0	95	24	0	119	23	62	14	0	99
13:15 13:30	24	37	35	0	96	20	44	9	0	73	0	83	17	0	100	36	67	17	0	120
13:30 13:45	27	36	29	0	92	17	33	10	0	60	2	83	19	0	104	23	73	23	0	119
13:45 14:00	23	42	41	0	106	23	46	9	0	78	1	90	23	0	114	25	74	16	0	115
Hourly Total	95	148	147	0	390	83	153	40	0	276	3	351	83	0	437	107	276	70	0	453
15:00 15:15	25	56	42	0	123	19	48	10	0	77	0	91	16	0	107	39	77	19	0	135
15:15 15:30	34	57	45	0	136	19	35	8	0	62	0	97	11	0	108	42	117	17	0	176
15:30 15:45	25	51	34	0	110	24	35	13	0	72	1	85	28	0	114	48	106	22	0	176
15:45 16:00	25	57	41	0	123	25	50	9	0	84	1	78	14	0	93	37	96	12	0	145
Hourly Total	109	221	162	0	492	87	168	40	0	295	2	351	69	0	422	166	396	70	0	632
16:00 16:15	39	58	45	0	142	17	80	9	0	106	2	90	25	0	117	39	91	19	0	149

Christie Street/Mountain Street

Main Street

North Approach						South Approach					East Approach					West Approach				
Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15 16:30	20	57	43	0	120	9	48	8	0	65	1	94	21	0	116	35	89	22	0	146
16:30 16:45	28	65	35	0	128	20	46	9	0	75	0	89	22	0	111	38	121	20	0	179
16:45 17:00	24	53	34	0	111	11	48	7	0	66	1	92	16	0	109	45	88	20	0	153
Hourly Total	111	233	157	0	501	57	222	33	0	312	4	365	84	0	453	157	389	81	0	627
17:00 17:15	26	71	36	0	133	14	41	11	0	66	0	90	23	0	113	45	90	18	0	153
17:15 17:30	25	66	40	0	131	14	39	9	0	62	0	78	22	0	100	38	75	18	0	131
17:30 17:45	29	55	34	0	118	8	49	13	0	70	1	64	17	0	82	41	76	13	0	130
17:45 18:00	24	46	29	0	99	10	44	4	0	58	0	77	17	0	94	36	72	14	0	122
Hourly Total	104	238	139	0	481	46	173	37	0	256	1	309	79	0	389	160	313	63	0	536
Grand Total	694	1362	1215	0	3271	571	1453	243	0	2267	14	2559	704	0	3277	1071	2372	463	0	3906
Truck %	3%	9%	3%	0%	5%	5%	10%	1%	0%	8%	7%	2%	3%	0%	2%	3%	3%	4%	0%	3%

Appendix E: Existing Signal Timing Plans



Signal Code: 012SSR

Intersection: RR12 (CHRISTIE ST.) & SOUTH SERVICE RD.

Municipality: grimsby

Owner: region

Last Modified: 2020-05-13 2:13:10 PM

Timing Parameters	NBD & SBD CHRISTIE	EBD TH	WBD TH	n/a	n/a	n/a
Min Green	8	12	12	0	0	0
Walk	7	9	0	0	0	0
Ped Clearance	7	16	0	0	0	0
Vehicle Ext.	2.1	2.1	2.1	0	0	0
Max Green	25	25	25	0	0	0
Yellow	4	4	4	0	0	0
All Red	3.2	2.8	2.8	0	0	0

Offset		
Minimum Cycle	34	0
Pedestrian Cycle	53	
Maximum Cycle	64	0
Operation	FA	

Installed On: 2020-05-13

Count Date: --/--/----

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: 012ELM

Intersection: RR12 (MOUNTAIN STREET) & ELM STREET

Municipality: grimsby

Owner: region

Last Modified: 2023-06-27 8:40:09 AM

Timing Parameters	NBD & SBD MOUNTAIN	EBD & WBD ELM	n/ a	n/ a	n/ a	n/ a
Min Green	8	8	0	0	0	0
Walk	8	8	0	0	0	0
Ped Clearance	12	10	0	0	0	0
Vehicle Ext.	2.5	2.5	0	0	0	0
Max Green	33	25	0	0	0	0
Yellow	4.1	4.1	0	0	0	0
All Red	2.2	2	0	0	0	0

Offset		
Minimum Cycle	28.4	0
Pedestrian Cycle	50.4	
Maximum Cycle	70.4	0
Operation	FA	

Installed On: 2018-05-04

Count Date: 2016-09-30

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: 012081

Intersection: RR12(Mountain St.) & RR81(Main St.)

Municipality: grimsby

Owner: region

Last Modified: 2021-05-03 1:49:12 PM

Timing Parameters	EBD MAIN ST. ADVANCE	WBD & EBD MAIN THRU	SBD & NBD CHRISTIE ADVANCE	NBD & SBD CHRISTIE THRU	n/a	n/a
Min Green	6	10	6	10	0	0
Walk	0	15	0	18	0	0
Ped Clearance	0	18	0	20	0	0
Vehicle Ext.	2.6	2.5	2.6	2.5	0	0
Max Green	20	50	10	50	0	0
Yellow	3	4.1	3	4.1	0	0
All Red	0	2.4	0	3.1	0	0
Offset						
Minimum Cycle			33.7	0		
Pedestrian Cycle			84.7			
Maximum Cycle			149.7	0		
Operation			FA			
Installed On:			2011-07-28			
Count Date:			2009-10-07			
FA = Fully Actuated		SA = Semi Actuated		FT = Fixed Time		
Copyright 2001 © Regional Niagara						

Appendix F: Intersection Analysis Worksheets



HCM Signalized Intersection Capacity Analysis

EX AM

1: Mountain Street & Main Street W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	180	50	0	260	60	70	220	25	65	180	185
Future Volume (vph)	135	180	50	0	260	60	70	220	25	65	180	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2	3.0	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00
Flbp. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97	0.97	0.97	1.00	0.98	1.00	0.98	1.00	0.92	1.00	0.92
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1611	1625	1651	1651	1598	1552	1581	1499	1581	1499	1581	1499
Flt Permitted	0.29	1.00	1.00	1.00	0.25	1.00	0.43	1.00	0.43	1.00	0.43	1.00
Satd. Flow (perm)	492	1625	1651	1651	414	1552	720	1499	720	1499	720	1499
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	165	220	61	0	317	73	85	268	30	79	220	226
RTOR Reduction (vph)	0	7	0	0	5	0	0	3	0	0	25	0
Lane Group Flow (vph)	165	274	0	0	385	0	85	295	0	79	421	0
Confl. Peds. (#/hr)	16	12	12	12	16	3	3	3	3	3	3	3
Confl. Bikes (#/hr)	1	8	8	8	1	8	1	8	1	8	1	8
Heavy Vehicles (%)	3%	4%	0%	0%	2%	5%	4%	12%	0%	5%	11%	2%
Turn Type	pm-pt	NA	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	NA	NA
Protected Phases	7	4	4	8	5	2	1	6	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	73.0	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Effective Green, g (s)	73.0	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Actuated g/C Ratio	0.49	0.49	0.49	0.33	0.40	0.33	0.40	0.33	0.40	0.33	0.40	0.33
Clearance Time (s)	3.0	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2	3.0	7.2
Lane Grp Cap (vph)	389	792	551	551	245	518	346	500	346	500	346	500
v/s Ratio Prot	c0.06	0.17	c0.23	c0.23	0.12	0.12	0.02	0.19	0.02	c0.28	0.02	c0.28
v/s Ratio Perm	0.15	0.42	0.35	0.70	0.35	0.57	0.23	0.23	0.35	0.57	0.23	0.23
v/c Ratio	0.42	0.35	0.70	0.70	0.35	0.57	0.23	0.23	0.35	0.57	0.23	0.23
Uniform Delay, d1	24.3	23.6	43.3	43.3	30.8	41.0	28.9	46.2	30.8	41.0	28.9	46.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	1.2	7.2	7.2	3.9	4.5	1.5	15.8	3.9	4.5	1.5	15.8
Delay (s)	27.6	24.8	50.5	50.5	34.7	45.5	30.4	62.0	34.7	45.5	30.4	62.0
Level of Service	C	C	D	D	C	D	C	E	C	D	C	E
Approach Delay (s)	25.9	25.9	50.5	50.5	43.1	43.1	57.2	57.2	43.1	43.1	57.2	57.2
Approach LOS	C	C	D	D	D	D	E	E	D	D	E	E
Intersection Summary												
HCM 2000 Control Delay	44.6	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.68	D										
Actuated Cycle Length (s)	149.7	Sum of lost time (s)										
Intersection Capacity Utilization	90.4%	19.7										
Analysis Period (min)	15	E										
Critical Lane Group												

BA Group

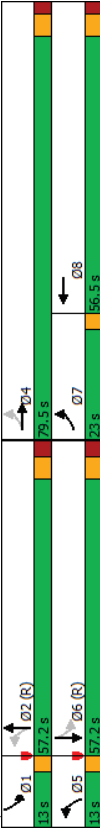
Synchro 11 Report

EX AM

1: Mountain Street & Main Street W

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	
Lane Configurations								
Traffic Volume (vph)	135	180	260	70	220	65	180	
Future Volume (vph)	135	180	260	70	220	65	180	
Lane Group Flow (vph)	165	281	390	85	298	79	446	
Turn Type	pm-pt	NA	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	7	4	8	5	2	1	6	
Permitted Phases	4			2		6		
Minimum Split (s)	9.0	39.5	39.5	9.0	45.2	9.0	45.2	
Total Split (s)	23.0	79.5	56.5	13.0	57.2	13.0	57.2	
Total Split (%)	15.4%	53.1%	37.7%	8.7%	38.2%	8.7%	38.2%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	3.1	0.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	7.2	3.0	7.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
v/c Ratio	0.41	0.35	0.70	0.33	0.57	0.22	0.85	
Control Delay	23.3	24.1	50.3	27.8	45.7	25.6	58.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.3	24.1	50.3	27.8	45.7	25.6	58.6	
Queue Length 50th (m)	27.5	50.8	104.0	15.3	75.7	14.1	120.6	
Queue Length 95th (m)	38.3	65.0	126.4	24.1	95.7	22.9	146.3	
Internal Link Dist (m)		87.2	97.9		57.4		357.9	
Turn Bay Length (m)	15.0			40.0				
Base Capacity (vph)	400	798	557	256	521	366	525	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.41	0.35	0.70	0.33	0.57	0.22	0.85	
Intersection Summary								
Cycle Length: 149.7								
Actuated Cycle Length: 149.7								
Offset: 0 (0%), Referenced to phase 2/NBTL and 6/SBTL; Start of Green								
Natural Cycle: 105								
Control Type: Pretimed								

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

Queues

EX AM

3. Mountain Street & Elm Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	35	105	35	135	70	270	5	170
Future Volume (vph)	35	105	35	135	70	270	5	170
Lane Group Flow (vph)	43	177	43	171	0	487	0	237
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	6	6	
Permitted Phases	4	8	8	2	2	6	6	
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.13	0.31	0.12	0.28	0.73	0.73	0.32	0.32
Control Delay	16.7	15.4	16.4	17.6	22.7	22.7	12.7	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	15.4	16.4	17.6	22.7	22.7	12.7	12.7
Queue Length 50th (m)	4.0	14.2	3.9	16.3	49.8	49.8	18.5	18.5
Queue Length 95th (m)	9.6	25.5	9.5	27.4	73.6	73.6	29.5	29.5
Internal Link Dist (m)	56.0		63.6		77.7		48.5	
Turn Bay Length (m)	115.0	35.0						
Base Capacity (vph)	337	570	368	607	666	666	732	732
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.31	0.12	0.28	0.73	0.73	0.32	0.32

Intersection Summary

Cycle Length: 70.4

Actuated Cycle Length: 70.4

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Splits and Phases: 3: Mountain Street & Elm Street



BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

EX AM

2. Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (veh/h)	0	0	310	0	0	195
Future Volume (Veh/h)	0	0	310	0	0	195
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	356	0	0	224
Pedestrians	2	2	5	5	2	2
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0
Right turn flare (veh)						
Median type			None	None	None	None
Median storage (veh)						
Upstream signal (m)			73			
pK, platoon unblocked						
VC, conflicting volume	587	360			358	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	587	360			358	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
dM capacity (veh/h)	473	687			1210	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	356	224			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1210			
Volume to Capacity	0.00	0.21	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			28.4%			
ICU Level of Service			A			
Analysis Period (min)			15			

BA Group

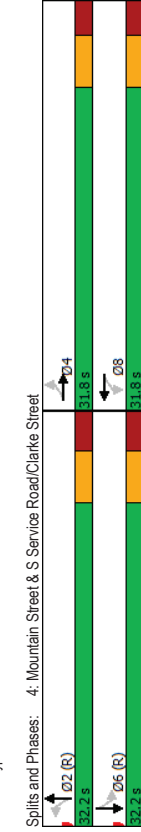
Synchro 11 Report

Queues
4: Mountain Street & S Service Road/Clarke Street

EX AM

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Group									
Lane Configurations									
Traffic Volume (vph)	85	85	60	145	40	350	20	310	
Future Volume (vph)	85	85	60	145	40	350	20	310	
Lane Group Flow (vph)	0	230	0	299	46	442	23	448	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	4		8		2		2	6	
Permitted Phases	4		8		2		2	6	
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2	
Total Split (s)	31.8	31.8	31.8	31.8	32.2	32.2	32.2	32.2	
Total Split (%)	49.7%	49.7%	49.7%	49.7%	50.3%	50.3%	50.3%	50.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	7.2	7.2	7.2	7.2	
Lead/Lag									
Lead-Lag Optimizer?									
v/c Ratio	0.49	0.54	0.16	0.38	0.07	0.37	0.07	0.37	
Control Delay	17.9	18.1	14.6	14.5	13.2	13.0	13.2	13.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.9	18.1	14.6	14.5	13.2	13.0	13.2	13.0	
Queue Length 50th (m)	19.2	25.3	3.6	19.0	1.7	17.2	1.7	17.2	
Queue Length 95th (m)	36.4	45.0	9.8	28.5	5.7	26.6	5.7	26.6	
Internal Link Dist (m)	220.5	196.8		357.9		100.3		100.3	
Turn Bay Length (m)		140.0			40.0				
Base Capacity (vph)	472	556	287	1171	307	1204	307	1204	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.49	0.54	0.16	0.38	0.07	0.37	0.07	0.37	

Intersection Summary
Cycle Length: 64
Actuated Cycle Length: 64
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Pretimed



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
3: Mountain Street & Elm Street

EX AM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Traffic Volume (vph)	35	105	40	35	135	5	70	270	60	5	170	20
Future Volume (vph)	35	105	40	35	135	5	70	270	60	5	170	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.1	6.1		6.1	6.1		6.3				6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00				1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00				1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00				1.00	
Prt	1.00	0.96		1.00	0.99		0.98				0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.99				1.00	
Satd. Flow (prot)	1392	1553		1528	1706		1552				1568	
Flt Permitted	0.65	1.00		0.65	1.00		0.90				0.99	
Satd. Flow (perm)	951	1553		1038	1706		1402				1551	
Peak-Hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	128	49	43	165	6	85	329	73	6	207	24
RTOR Reduction (vph)	0	19	0	0	2	0	0	9	0	0	6	0
Lane Group Flow (vph)	43	158	0	43	169	0	478	0	0	231	0	0
Confl. Peds. (#/hr)	8	5	5	5	8	3	2	2	2	2	3	3
Confl. Bikes (#/hr)												
Heavy Vehicles (%)	18%	1%	23%	8%	2%	0%	9%	8%	14%	17%	10%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		33.0			33.0		
Effective Green, g (s)	25.0	25.0		25.0	25.0		33.0			33.0		
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47			0.47		
Clearance Time (s)	6.1	6.1		6.1	6.1		6.3			6.3		
Lane Grp Cap (vph)	337	551		368	605		657			727		
v/s Ratio Prot	c0.10			0.10								
v/s Ratio Perm	0.05			0.04			c0.34			0.15		
v/c Ratio	0.13	0.29		0.12	0.28		0.73			0.32		
Uniform Delay, d1	15.3	16.3		15.3	16.3		15.1			11.7		
Progression Factor	1.00	1.00		1.00	1.00		1.00			1.00		
Incremental Delay, d2	0.8	1.3		0.6	1.1		0.9			1.1		
Delay (s)	16.1	17.6		15.9	17.4		22.0			12.8		
Level of Service	B	B		B	B		C			B		
Approach Delay (s)		17.3			17.1		22.0			12.8		
Approach LOS		B			B		C			B		
Intersection Summary												
HCM 2000 Control Delay		18.3			HCM 2000 Level of Service		B					
HCM 2000 Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		70.4			Sum of lost time (s)		12.4					
Intersection Capacity Utilization		82.6%			ICU Level of Service		E					
Analysis Period (min)		15										
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

																													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT	SBT
Lane Configurations																													
Traffic Volume (veh/h)	15	0	5	0	0	0	10	10	290	10	20	190	20																
Future Volume (Veh/h)	15	0	5	0	0	0	10	10	290	10	20	190	20																
Sign Control	Stop	Stop			Stop				Free			Free																	
Grade		0%			0%																								
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	
Hourly flow rate (vph)	18	0	6	0	0	12	12	12	354	12	24	232	24																
Pedestrians		4			4				4			4																	
Lane Width (m)		3.6			3.6				3.6			3.6																	
Walking Speed (m/s)		1.2			1.2				1.2			1.2																	
Percent Blockage		0			0				0			0																	
Right turn flare (veh)																													
Median type																													
Median storage (veh)																													
Upstream signal (m)																													
pX, platoon unblocked																													
vC, conflicting volume	696	690	252	690	696	368	368	260				370																	
vC1, stage 1 conf vol																													
vC2, stage 2 conf vol																													
vCU, unblocked vol	696	690	252	690	696	368	368	260				370																	
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1																		
IC, 2 stage (s)																													
IF, 2 stage (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2																		
p0 queue free %	95	100	99	100	100	98	99				98																		
cM capacity (veh/h)	341	338	786	347	355	677	1312				1196																		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																									
Volume Total	24	12	378	280																									
Volume Left	18	0	12	24																									
Volume Right	6	12	12	24																									
cSH	397	677	1312	1196																									
Volumes to Capacity	0.06	0.02	0.01	0.02																									
Queue Length 95th (m)	1.5	0.4	0.2	0.5																									
Control Delay (s)	14.7	10.4	0.3	0.9																									
Lane LOS	B	B	A	A																									
Approach Delay (s)	14.7	10.4	0.3	0.9																									
Approach LOS	B	B																											
Intersection Summary																													
Average Delay			1.2																										
Intersection Capacity Utilization			36.6%																										
Analysis Period (min)			15																										
																			</										

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

	↖	→	↗	↙	↘	↖	↗	↙	↘	↖	↗	↙	↘	↖	↗	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations		↕			↕		↖	↗		↖	↗						
Traffic Volume (vph)	85	85	30	60	145	55	40	350	35	20	310	80					
Future Volume (vph)	85	85	30	60	145	55	40	350	35	20	310	80					
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750					
Total Lost time (s)	6.8				6.8		7.2	7.2		7.2		7.2					
Lane Util. Factor	1.00				1.00		1.00	1.00	0.95	1.00	0.95	1.00					
Fpb, ped/bikes	1.00				1.00		1.00	1.00	1.00	1.00	0.99	1.00					
Fpb, ped/bikes	1.00				1.00		1.00	1.00	1.00	1.00	0.97	1.00					
Frt	0.98				0.97		1.00	0.99	1.00	1.00	0.97	1.00					
Flt Protected	0.98				0.99		0.95	1.00	1.00	0.95	1.00	1.00					
Satd Flow (prot)	1550				1578		1417	2971		1509	2992						
Flt Permitted	0.75				0.87		0.49	1.00	1.00	0.50	1.00						
Satd Flow (perm)	1185				1384		735	2971		788	2992						
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87					
Adj. Flow (vph)	98	98	34	69	167	63	46	402	40	23	356	92					
RTOR Reduction (vph)	0	10	0	0	15	0	0	12	0	0	36	0					
Lane Group Flow (vph)	0	220	0	0	284	0	46	430	0	23	412	0					
Conf. Peds. (#/hr)							2		1		2						
Heavy Vehicles (%)	7%	8%	13%	12%	6%	2%	17%	10%	12%	10%	9%	0%					
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA					
Protected Phases		4			8			2			6						
Permitted Phases	4		8				2										
Actuated Green, G (s)	25.0			8	25.0		25.0	25.0	25.0	25.0	25.0	25.0					
Effective Green, g (s)	25.0			25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0					
Actuated g/C Ratio	0.39			0.39	0.39		0.39	0.39	0.39	0.39	0.39	0.39					
Clearance Time (s)	6.8			6.8	6.8		7.2	7.2	7.2	7.2	7.2	7.2					
Lane Grp Cap (vph)	462			540	540		287	1160	1160	307	1168						
v/s Ratio Prot	0.19				c0.20		0.06		c0.14		0.14						
v/s Ratio Perm	0.48				0.53		0.16	0.37	0.07	0.03							
v/c Ratio	0.48				0.53		0.16	0.37	0.07	0.03							
Uniform Delay, d1	14.6			15.0	15.0		12.7	13.9	12.2	13.8							
Progression Factor	1.00			1.00	1.00		1.00	1.00	1.00	1.00	1.00						
Incremental Delay, d2	3.5			3.6	3.6		1.2	0.9	0.5	0.8							
Delay (s)	18.1			18.1	18.6		13.9	14.8	12.7	14.6							
Level of Service	B			B	B		B	B	B	B							
Approach Delay (s)	18.1			18.6			14.7			14.5							
Approach LOS	B			B			B			B							
Intersection Summary																	
HCN 2000 Control Delay			16.0				HCN 2000 Level of Service		B								
HCN 2000 Volume to Capacity ratio			0.45														
Actuated Cycle Length (s)			64.0				Sum of lost time (s)		14.0								
Intersection Capacity Utilization			57.7%				ICU Level of Service		B								
Analysis Period (min)			15														
Critical Lane Group																	

HCM Signalized Intersection Capacity Analysis

EX PM

1: Mountain Street & Main Street W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	175	455	75	0	390	85	95	205	45	135	225	180
Future Volume (vph)	175	455	75	0	390	85	95	205	45	135	225	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	7.2	3.0	7.2	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	0.98	0.99	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.98
Frt	1.00	0.98	0.98	1.00	0.98	1.00	1.00	0.97	1.00	0.95	1.00	0.93
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1599	1649	1657	1657	1660	1550	1621	1517	1621	1517	1621	1517
Flt Permitted	0.15	1.00	1.00	1.00	0.26	1.00	0.47	1.00	0.47	1.00	0.47	1.00
Satd. Flow (perm)	258	1649	1657	1657	1657	1657	451	1550	451	1550	806	1517
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	489	81	0	419	91	102	220	48	145	242	194
RTOR Reduction (vph)	0	4	0	0	5	0	0	5	0	0	19	0
Lane Group Flow (vph)	188	566	0	0	505	0	102	263	0	145	417	0
Confl. Peds. (#/hr)	27	43	43	27	8	11	11	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	8	5	2	1	6	1	6	1	6	1
Permitted Phases	4	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Actuated Green, G (s)	73.0	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Effective Green, g (s)	73.0	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Actuated g/C Ratio	0.49	0.49	0.49	0.33	0.40	0.33	0.40	0.33	0.40	0.33	0.40	0.33
Clearance Time (s)	3.0	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2	3.0	7.2
Lane Grp Cap (vph)	304	804	553	261	517	377	506	377	506	377	506	377
v/s Ratio Prot	0.08	c0.34	c0.30	c0.03	0.17	0.03	c0.27	0.03	c0.27	0.03	c0.27	0.03
v/s Ratio Perm	0.22	0.22	0.22	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.62	0.70	0.91	0.39	0.51	0.39	0.51	0.39	0.51	0.39	0.51	0.39
Uniform Delay, d1	27.9	29.9	47.8	30.9	40.0	29.9	45.8	29.9	45.8	29.9	45.8	29.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	5.1	21.9	4.4	3.5	3.0	14.1	3.0	14.1	3.0	14.1	3.0
Delay (s)	37.0	35.0	69.6	35.3	43.5	32.9	59.9	32.9	59.9	32.9	59.9	32.9
Level of Service	D	D	E	D	D	C	E	C	E	C	E	C
Approach Delay (s)	35.5	35.5	69.6	41.3	41.3	53.1	53.1	41.3	41.3	53.1	53.1	41.3
Approach LOS	D	D	E	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	48.9											
HCM 2000 Level of Service	D											
HCM 2000 Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	149.7											
Sum of lost time (s)	19.7											
Intersection Capacity Utilization	96.7%											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

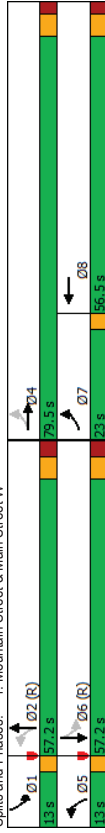
Synchro 11 Report

EX PM

1: Mountain Street & Main Street W

Queue	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	175	455	75	0	390	85	95	205	45	135	225	180
Future Volume (vph)	175	455	75	0	390	85	95	205	45	135	225	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	7.2	3.0	7.2	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	0.98	0.99	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.98
Frt	1.00	0.98	0.98	1.00	0.98	1.00	1.00	0.97	1.00	0.95	1.00	0.93
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1599	1649	1657	1657	1660	1550	1621	1517	1621	1517	1621	1517
Flt Permitted	0.15	1.00	1.00	1.00	0.26	1.00	0.47	1.00	0.47	1.00	0.47	1.00
Satd. Flow (perm)	258	1649	1657	1657	1657	1657	451	1550	451	1550	806	1517
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	489	81	0	419	91	102	220	48	145	242	194
RTOR Reduction (vph)	0	4	0	0	5	0	0	5	0	0	19	0
Lane Group Flow (vph)	188	566	0	0	505	0	102	263	0	145	417	0
Confl. Peds. (#/hr)	27	43	43	27	8	11	11	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	8	5	2	1	6	1	6	1	6	1
Permitted Phases	4	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Actuated Green, G (s)	73.0	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Effective Green, g (s)	73.0	73.0	73.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0	60.0	50.0
Actuated g/C Ratio	0.49	0.49	0.49	0.33	0.40	0.33	0.40	0.33	0.40	0.33	0.40	0.33
Clearance Time (s)	3.0	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2	3.0	7.2
Lane Grp Cap (vph)	304	804	553	261	517	377	506	377	506	377	506	377
v/s Ratio Prot	0.08	c0.34	c0.30	c0.03	0.17	0.03	c0.27	0.03	c0.27	0.03	c0.27	0.03
v/s Ratio Perm	0.22	0.22	0.22	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.62	0.70	0.91	0.39	0.51	0.39	0.51	0.39	0.51	0.39	0.51	0.39
Uniform Delay, d1	27.9	29.9	47.8	30.9	40.0	29.9	45.8	29.9	45.8	29.9	45.8	29.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	5.1	21.9	4.4	3.5	3.0	14.1	3.0	14.1	3.0	14.1	3.0
Delay (s)	37.0	35.0	69.6	35.3	43.5	32.9	59.9	32.9	59.9	32.9	59.9	32.9
Level of Service	D	D	E	D	D	C	E	C	E	C	E	C
Approach Delay (s)	35.5	35.5	69.6	41.3	41.3	53.1	53.1	41.3	41.3	53.1	53.1	41.3
Approach LOS	D	D	E	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	149.7											
Actuated Cycle Length: 149.7												
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 105												
Control Type: Prelimed												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

3. Mountain Street & Elm Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	55	245	70	180	70	260	25	245
Future Volume (vph)	55	245	70	180	70	260	25	245
Lane Group Flow (vph)	56	367	71	199	0	423	0	296
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	8	8	2	2	6	6	6
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.15	0.61	0.27	0.32	0.62	0.62	0.40	0.40
Control Delay	16.9	21.8	19.7	17.8	18.0	14.0	14.0	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	21.8	19.7	17.8	18.0	14.0	14.0	14.0
Queue Length 50th (m)	5.2	36.6	6.9	19.0	39.0	24.8	24.8	24.8
Queue Length 95th (m)	13.0	63.6	16.9	34.8	68.4	43.0	43.0	43.0
Internal Link Dist (m)	56.0	56.0	63.6	63.6	77.7	48.5	48.5	48.5
Turn Bay Length (m)	115.0	35.0						
Base Capacity (vph)	373	605	262	616	683	738	738	738
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.61	0.27	0.32	0.62	0.62	0.40	0.40

Intersection Summary

Cycle Length: 70.4

Actuated Cycle Length: 70.4

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Splits and Phases: 3: Mountain Street & Elm Street



HCM Unsignalized Intersection Capacity Analysis

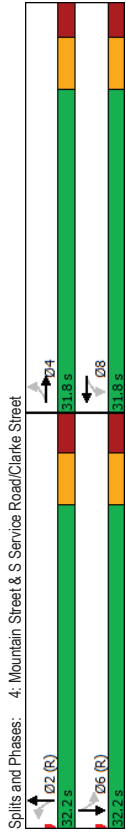
2. Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (veh/h)	0	0	330	0	0	290
Future Volume (Veh/h)	0	0	330	0	0	290
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	344	0	0	302
Pedestrians	9	9	1	1	1	1
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	1	1	0	0	0	0
Right turn flare (veh)						
Median type			None	None	None	None
Median storage (veh)						
Upstream signal (m)			73			
pK, platoon unblocked						
VC, conflicting volume	656	354			353	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	656	354			353	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
dM capacity (veh/h)	430	689			1208	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	344	302			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1208			
Volume to Capacity	0.00	0.20	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			28.2%			
ICU Level of Service			A			
Analysis Period (min)			15			

Queues
4: Mountain Street & S Service Road/Clarke Street

EX PM

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	145	220	40	145	50	365	35	460	
Traffic Volume (vph)	145	220	40	145	50	365	35	460	
Future Volume (vph)	0	469	0	221	52	422	36	546	
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Turn Type	4	8	2	2	6	6			
Protected Phases	4	8	2	2	6	6			
Permitted Phases	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2	
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2	
Total Split (%)	49.7%	49.7%	49.7%	49.7%	50.3%	50.3%	50.3%	50.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time (s)	6.8	6.8	7.2	7.2	7.2	7.2	7.2	7.2	
Lead/Lag									
Lead-Lag Optimize?	0.84	0.38	0.18	0.34	0.10	0.43			
v/c Ratio	33.0	15.4	14.7	13.8	13.5	14.8			
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0			
Queue Delay	33.0	15.4	14.7	13.8	13.5	14.8			
Total Delay	48.7	17.6	4.1	17.6	2.8	23.7			
Queue Length 50th (m)	#100.7	33.9	11.2	27.8	8.2	36.1			
Queue Length 95th (m)	220.5	196.8		357.9	100.3				
Internal Link Dist (m)	140.0				40.0				
Turn Bay Length (m)	560	580	296	1240	344	1259			
Base Capacity (vph)	0	0	0	0	0	0			
Starvation Cap Reductn	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0			
Reduced v/c Ratio	0.84	0.38	0.18	0.34	0.10	0.43			
Intersection Summary									
Cycle Length: 64									
Actuated Cycle Length: 64									
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green									
Natural Cycle: 55									
Control Type: Pretimed									
# 95th percentile volume exceeds capacity, queue may be longer.									
Queue shown is maximum after two cycles.									



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
3: Mountain Street & Elm Street

EX PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	55	245	115	70	180	15	70	260	85	25	245	20
Traffic Volume (vph)	55	245	115	70	180	15	70	260	85	25	245	20
Future Volume (vph)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Ideal Flow (vphpl)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	0.95	1.00	0.99	1.00	0.99	0.97	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1577	1637	1658	1725	1590	1590	1653	1653	1653	1653	1653	1653
Flt Permitted	0.63	1.00	0.42	1.00	0.88	0.88	0.94	0.94	0.94	0.94	0.94	0.94
Satd. Flow (perm)	1051	1637	738	1725	1430	1430	1567	1567	1567	1567	1567	1567
Peak-Hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	56	250	117	71	184	15	71	265	87	26	250	20
RTOR Reduction (vph)	0	24	0	0	4	0	0	13	0	0	4	0
Lane Group Flow (vph)	56	343	0	71	195	0	410	0	0	292	0	7
Conf. Ped. (#/hr)	9	3	3	3	9	7	1	1	1	1	1	7
Heavy Vehicles (%)	4%	0%	3%	0%	0%	3%	8%	0%	0%	5%	0%	0%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	4	4	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated G/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	373	581	262	612	670	670	734	734	734	734	734	734
v/s Ratio Prot	0.05	0.10	0.10	0.10	0.10	0.10	0.19	0.19	0.19	0.19	0.19	0.19
v/s Ratio Perm	0.15	0.59	0.27	0.32	0.32	0.32	0.61	0.61	0.61	0.61	0.61	0.61
Uniform Delay, d1	15.5	18.5	16.2	16.5	13.9	13.9	12.2	12.2	12.2	12.2	12.2	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	4.4	2.5	1.4	4.1	4.1	1.6	1.6	1.6	1.6	1.6	1.6
Delay (s)	16.3	22.9	18.7	17.9	18.1	18.1	13.8	13.8	13.8	13.8	13.8	13.8
Level of Service	B	C	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	22.0	18.1	18.1	18.1	18.1	18.1	13.8	13.8	13.8	13.8	13.8	13.8
Approach LOS	C	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B									
HCM 2000 Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	12.4									
Intersection Capacity Utilization	85.2%	ICU Level of Service	E									
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

EX PM

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	25	15	35	10	20	30	15	230	25	10	245	45	
Future Volume (Veh/h)	25	15	35	10	20	30	15	230	25	10	245	45	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Hourly flow rate (vph)	26	15	36	10	21	31	15	239	26	10	253	46	
Pedestrians	4			4			4			15			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	0			0			0			1			
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (m)							120			81			
pX platoon unblocked													
VC, conflicting volume	698	659	284	690	669	331	303			329			
VC1, stage 1 conf vol													
VC2, stage 2 conf vol													
Vcu, unblocked vol	698	659	284	690	669	331	303			329			
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
IC, 2 stage (s)													
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 capacity (veh/h)	315	376	755	326	371	704	1265			1238			
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	77	62	340	309									
Volume Left	26	10	15	10									
Volume Right	36	31	26	46									
cSH	453	472	1265	1238									
Volume to Capacity	0.17	0.13	0.01	0.01									
Queue Length 95th (m)	4.9	3.6	0.3	0.2									
Control Delay (s)	14.6	13.8	0.5	0.3									
Lane LOS	B	B	A	A									
Approach Delay (s)	14.6	13.8	0.5	0.3									
Approach LOS	B	B											
Intersection Summary													
Average Delay	2.8												
Intersection Capacity Utilization	41.1%			ICU Level of Service									
Analysis Period (min)	15			A									

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

EX PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	220	90	40	145	30	50	365	45	35	460	70
Future Volume (vph)	145	220	90	40	145	30	50	365	45	35	460	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8		6.8		6.8		7.2		7.2		7.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.97	0.97	0.98	0.98	0.98	1.00	0.98	1.00	0.95	1.00	0.98
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	0.98	1.00	0.95	1.00	0.98
Satd. Flow (prot)	1667	1667	1663	1663	1663	1663	1625	3136	1658	3176		
Flt Permitted	0.83	0.83	0.83	0.87	0.87	0.87	0.44	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)	1400	1400	1400	1461	1461	1461	760	3136	882	3176		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	227	93	41	149	31	52	376	46	36	474	72
RTOR Reduction (vph)	0	14	0	0	9	0	0	15	0	0	19	0
Lane Group Flow (vph)	0	455	0	0	212	0	52	407	0	36	527	0
Confli. Peds. (#/hr)	1	1	1	1	1	1	3	2	2	2	3	3
Heavy Vehicles (%)	1%	0%	0%	5%	2%	0%	2%	4%	4%	0%	2%	4%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	25.0		25.0		25.0		25.0		25.0		25.0	
Effective Green, g (s)	25.0		25.0		25.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.39		0.39		0.39		0.39		0.39		0.39	
Clearance Time (s)	6.8		6.8		6.8		7.2		7.2		7.2	
Lane Grp Cap (vph)	546		570		570		296		1225		344	
v/s Ratio Prot												
v/s Ratio Perm	c0.32		0.14		0.14		0.07		0.04		c0.17	
v/c Ratio	0.83		0.37		0.37		0.18		0.10		0.43	
Uniform Delay, d1	17.6		13.9		13.9		12.8		13.7		12.4	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	13.9		1.9		1.9		1.3		0.7		0.6	
Delay (s)	31.5		15.8		15.8		14.0		14.4		13.0	
Level of Service	C		B		B		B		B		B	
Approach Delay (s)	31.5		15.8		15.8		14.4		14.4		15.2	
Approach LOS	C		B		B		B		B		B	
Intersection Summary												
HCM 2000 Control Delay	19.4		HCM 2000 Level of Service		B							
HCM 2000 Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	64.0		Sum of lost time (s)		14.0							
Intersection Capacity Utilization	86.2%		ICU Level of Service		E							
Analysis Period (min)	15											
Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
1: Mountain Street & Main Street W

FB AM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	135	200	50	0	285	60	70	245	25	65	200	185
Traffic Volume (vph)	135	200	50	0	285	60	70	245	25	65	200	185
Future Volume (vph)	135	200	50	0	285	60	70	245	25	65	200	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5		6.5		3.0	7.2		3.0	7.2		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		0.99		1.00	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		0.98		1.00	0.99	1.00	0.99	1.00	0.93	
Flt Protected	0.95	1.00		1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1611	1629		1656		1598	1553	1581	1503			
Flt Permitted	0.27	1.00		1.00		0.29	1.00	0.44	1.00			
Satd. Flow (perm)	459	1629		1656		489	1553	733	1503			
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	165	244	61	0	348	73	85	299	30	79	244	226
RTOR Reduction (vph)	0	6	0	0	5	0	0	2	0	0	22	0
Lane Group Flow (vph)	165	299	0	0	416	0	85	327	0	79	448	0
Confl. Peds. (#/hr)	16	12	12	16	3	3	3	3	3	3	3	3
Confl. Bikes (#/hr)	1			8								
Heavy Vehicles (%)	3%	4%	0%	0%	2%	5%	4%	12%	0%	5%	11%	2%
Turn Type	pm-pt	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4		8		5	2		1	6		
Permitted Phases	4					2			6			
Actuated Green, G (s)	67.2	67.2		52.2		65.8	59.8		65.8	59.8		
Effective Green, g (s)	67.2	67.2		52.2		65.8	59.8		65.8	59.8		
Actuated g/C Ratio	0.45	0.45		0.35		0.44	0.44		0.44	0.40		
Clearance Time (s)	3.0	6.5		6.5		3.0	7.2		3.0	7.2		
Lane Grp Cap (vph)	298	731		577		259	620		356	600		
v/s Ratio Prot	0.04	0.18		0.25		0.01	0.21		0.01	0.30		
v/s Ratio Perm	0.20			0.13		0.33			0.09			
v/c Ratio	0.55	0.41		0.72		0.33	0.53		0.22	0.75		
Uniform Delay, d1	28.2	27.8		42.4		27.1	34.2		25.4	38.5		
Progression Factor	1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	7.2	1.7		7.6		3.4	3.2		1.4	8.2		
Delay (s)	35.4	29.5		50.0		30.4	37.4		26.8	46.7		
Level of Service	D	C		D		C	D		C	D		
Approach Delay (s)	31.6			50.0		35.9			43.8			
Approach LOS	C			D		D			D			
Intersection Summary												
HCM 2000 Control Delay	40.4											
HCM 2000 Level of Service	D											
HCM 2000 Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	149.7											
Intersection Capacity Utilization	90.4%											
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

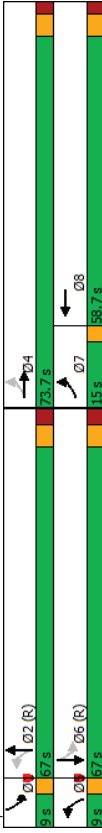
Synchro 11 Report

Queues
1: Mountain Street & Main Street W

FB AM (2030)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	135	200	50	0	285	60	70	245	25	65	200	185
Traffic Volume (vph)	135	200	50	0	285	60	70	245	25	65	200	185
Future Volume (vph)	135	200	50	0	285	60	70	245	25	65	200	185
Lane Group Flow (vph)	165	305	421	85	329	79	470					
Turn Type	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	8	5	2	1	6					
Permitted Phases	4					2			6			
Minimum Split (s)	9.0	39.5	39.5	9.0	45.2	9.0	45.2	9.0	45.2	9.0	45.2	9.0
Total Split (s)	15.0	73.7	58.7	9.0	67.0	9.0	67.0	9.0	67.0	9.0	67.0	9.0
Total Split (%)	10.0%	49.2%	39.2%	6.0%	44.8%	6.0%	44.8%	6.0%	44.8%	6.0%	44.8%	6.0%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	3.0	4.1	3.0	4.1	3.0	4.1	3.0
All-Red Time (s)	0.0	2.4	2.4	0.0	3.1	0.0	3.1	0.0	3.1	0.0	3.1	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2	3.0	7.2	3.0
Lead/Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
v/c Ratio	0.54	0.41	0.72	0.31	0.53	0.21	0.75					
Control Delay	30.2	29.0	50.0	24.2	37.6	22.4	44.5					
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
Total Delay	30.2	29.0	50.0	24.2	37.6	22.4	44.5					
Queue Length 50th (m)	29.8	61.3	112.5	14.1	76.8	13.1	116.8					
Queue Length 95th (m)	41.6	77.7	135.5	22.2	96.1	21.2	140.8					
Internal Link Dist (m)	87.2	97.9		57.4		357.9						
Turn Bay Length (m)	15.0			40.0								
Base Capacity (vph)	308	737	583	273	622	376	623					
Starvation Cap Reductn	0	0	0	0	0	0	0					
Spillback Cap Reductn	0	0	0	0	0	0	0					
Storage Cap Reductn	0	0	0	0	0	0	0					
Reduced v/c Ratio	0.54	0.41	0.72	0.31	0.53	0.21	0.75					
Intersection Summary												
Cycle Length: 149.7												
Actuated Cycle Length: 149.7												
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 105												
Control Type: Prelimed												

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

Queues

3. Mountain Street & Elm Street

FB AM (2030)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	35	115	35	150	70	295	5	190
Future Volume (vph)	35	115	35	150	70	295	5	190
Lane Group Flow (vph)	43	189	43	189	0	518	0	262
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.13	0.33	0.12	0.31	0.78	0.78	0.36	0.36
Control Delay	16.7	16.0	16.5	18.0	25.3	25.3	13.2	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	16.0	16.5	18.0	25.3	25.3	13.2	13.2
Queue Length 50th (m)	4.0	15.7	3.9	18.3	55.3	55.3	21.0	21.0
Queue Length 95th (m)	9.6	27.5	9.5	30.0	80.9	80.9	32.9	32.9
Internal Link Dist (m)	56.0	56.0	63.6	63.6	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0	35.0	35.0	66.7	66.7	73.3	73.3
Base Capacity (vph)	332	573	365	607	667	667	733	733
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.33	0.12	0.31	0.78	0.78	0.36	0.36

Intersection Summary

Cycle Length: 70.4

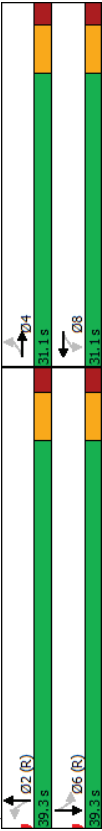
Actuated Cycle Length: 70.4

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Splits and Phases: 3. Mountain Street & Elm Street



BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

FB AM (2030)

2. Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	0	335	0	0	215
Future Volume (Veh/h)	0	0	335	0	0	215
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	385	0	0	247
Pedestrians	2	2	5	5	2	2
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0
Right turn flare (veh)						
Median type			None	None	None	None
Median storage (veh)						
Upstream signal (m)			73			129
pK, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	639	389			387	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	481	185			183	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
dM capacity (veh/h)	460	726			1185	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	385	247			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1185			
Volume to Capacity	0.00	0.23	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			28.8%			
ICU Level of Service			A			
Analysis Period (min)			15			

BA Group

Synchro 11 Report

Queues

FB AM (2030)

4: Mountain Street & S Service Road/Clarke Street

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Configurations	85	95	60	160	40	375	20	330
Traffic Volume (vph)	85	95	60	160	40	375	20	330
Future Volume (vph)	0	241	0	316	46	471	23	471
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type								
Protected Phases	4	8	8	2	2	6		
Permitted Phases	4							
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Total Split (s)	31.8	31.8	31.8	31.8	32.2	32.2	32.2	32.2
Total Split (%)	49.7%	49.7%	49.7%	49.7%	50.3%	50.3%	50.3%	50.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	7.2	7.2	7.2	7.2	7.2	7.2
Lead/Lag								
Lead-Lag Optimizer?								
v/c Ratio	0.51	0.57	0.16	0.40	0.40	0.08	0.08	0.39
Control Delay	18.6	18.9	14.7	14.8	13.2	13.5		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	18.6	18.9	14.7	14.8	13.2	13.5		
Queue Length 50th (m)	20.6	27.5	3.6	20.6	1.7	18.6		
Queue Length 95th (m)	38.7	48.2	9.8	30.6	5.7	28.4		
Internal Link Dist (m)	220.5	196.8		357.9	100.3			
Turn Bay Length (m)		140.0			40.0			
Base Capacity (vph)	471	557	280	1172	299	1203		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.51	0.57	0.16	0.40	0.40	0.08	0.08	0.39

Intersection Summary

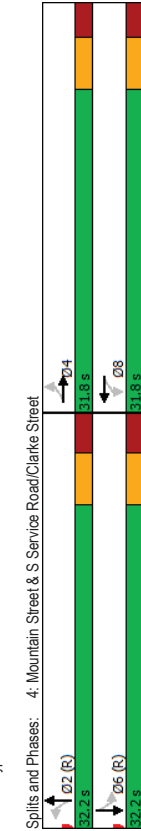
Cycle Length: 64

Actuated Cycle Length: 64

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB AM (2030)

3: Mountain Street & Elm Street

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	85	115	40	35	150	5	70	295	60	5	190	20
Traffic Volume (vph)	35	115	40	35	150	5	70	295	60	5	190	20
Future Volume (vph)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Ideal Flow (vphpl)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96	1.00	1.00	1.00	1.00	0.98	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00
Satd. Flow (prot)	1392	1564	1528	1707	1707	1707	1556	1556	1570	1570	1570	1570
Flt Permitted	0.64	1.00	0.64	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90
Satd. Flow (perm)	936	1564	1027	1707	1707	1707	1406	1406	1406	1406	1406	1406
Peak-Hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	140	49	43	183	6	85	360	73	6	232	24
RTOR Reduction (vph)	0	18	0	0	2	0	0	9	0	0	5	0
Lane Group Flow (vph)	43	171	0	43	187	0	0	510	0	0	257	0
Confl. Peds. (#/hr)	8	5	5	5	8	3	2	2	2	2	2	3
Confl. Bikes (#/hr)	1											
Heavy Vehicles (%)	18%	1%	23%	8%	2%	0%	9%	8%	14%	17%	10%	5%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	332	555	364	606	606	606	669	669	669	669	669	669
v/s Ratio Prot	0.11			0.11								
v/s Ratio Perm	0.05			0.04			0.36			0.17		
v/c Ratio	0.13	0.31	0.12	0.31	0.12	0.31	0.77	0.77	0.77	0.35	0.35	0.35
Uniform Delay, d1	15.3	16.4	15.3	16.4	15.3	16.4	15.6	15.6	15.6	11.9	11.9	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.4	0.7	1.3	0.7	1.3	8.6	8.6	8.6	1.3	1.3	1.3
Delay (s)	16.1	17.9	15.9	17.8	16.1	17.8	24.2	24.2	24.2	13.2	13.2	13.2
Level of Service	B	B	B	B	B	B	C	C	C	B	B	B
Approach Delay (s)	17.6			17.4			24.2			13.2		
Approach LOS	B			B			C			B		
Intersection Summary												
HCM 2000 Control Delay							19.4					B
HCM 2000 Volume to Capacity ratio							0.57					
Actuated Cycle Length (s)							70.4					12.4
Intersection Capacity Utilization							84.0%					E
Analysis Period (min)							15					
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

FB AM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	5	0	0	10	10	315	10	20	210	20
Future Volume (Veh/h)	15	0	5	0	0	10	10	315	10	20	210	20
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	18	0	6	0	0	12	12	384	12	24	256	24
Pedestrians	4	4	4	4	4	4	4	4	4	4	4	4
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0	0	0	0	0	0	0
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
VC, conflicting volume	750	744	276	744	750	398	284	284	400	400	400	400
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	667	661	276	661	667	276	284	284	279	279	279	279
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1	4.1	4.1	4.1	4.1
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
IF (s)	94	100	99	100	100	98	99	99	98	98	98	98
CM capacity (veh/h)	320	335	762	327	332	686	1286	1286	1163	1163	1163	1163
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 1							
Volume Total	24	12	408	304								
Volume Left	18	0	12	24								
Volume Right	6	12	12	24								
cSH	375	686	1286	1163								
Volume to Capacity	0.06	0.02	0.01	0.02								
Queue Length 95th (m)	1.6	0.4	0.2	0.5								
Control Delay (s)	15.3	10.3	0.3	0.8								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.3	10.3	0.3	0.8								
Approach LOS	C	B	A	A								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			38.1%									
Analysis Period (min)			15									

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

FB AM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	95	30	60	160	55	40	375	35	20	330	80
Future Volume (vph)	85	95	30	60	160	55	40	375	35	20	330	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554
Flt Permitted	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Satd. Flow (perm)	1182	1182	1182	1182	1182	1182	1182	1182	1182	1182	1182	1182
Peak-Hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	98	109	34	69	184	63	46	431	40	23	379	92
RTOR Reduction (vph)	0	9	0	0	14	0	0	11	0	0	33	0
Lane Group Flow (vph)	0	232	0	0	302	0	46	460	0	23	438	0
Conf. Peds. (#/hr)												
Heavy Vehicles (%)	7%	8%	13%	12%	6%	2%	17%	10%	12%	10%	9%	0%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases												
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0			25.0			25.0			25.0		
Effective Green, g (s)	25.0			25.0			25.0			25.0		
Actuated g/C Ratio	0.39			0.39			0.39			0.39		
Clearance Time (s)	6.8			6.8			7.2			7.2		
Lane Grp Cap (vph)	461			543			280			299		
v/s Ratio Prot												
v/s Ratio Perm	0.20			0.22			0.06			0.03		
v/c Ratio	0.50			0.56			0.16			0.08		
Uniform Delay, d1	14.8			15.2			12.7			12.3		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	3.9			4.1			1.3			0.5		
Delay (s)	18.7			19.3			14.0			12.8		
Level of Service	B			B			B			B		
Approach Delay (s)	18.7			19.3			15.0			14.7		
Approach LOS	B			B			B			B		
Intersection Summary												
HCM 2000 Control Delay			16.3									
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			64.0									
Intersection Capacity Utilization			59.3%									
Analysis Period (min)			15									
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB PM (2030)

1: Mountain Street & Main Street W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	175	500	75	0	430	85	95	225	45	135	250	180
Future Volume (vph)	175	500	75	0	430	85	95	225	45	135	250	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	7.2	7.2	3.0	7.2	3.0	7.2	7.2	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	0.98	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frt	1.00	0.98	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.94	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1599	1654	1661	1661	1552	1621	1521	1621	1521	1621	1521	1521
Flt Permitted	0.20	1.00	1.00	0.26	1.00	0.46	1.00	0.46	1.00	0.46	1.00	1.00
Satd. Flow (perm)	341	1654	1661	449	1552	787	1521	787	1521	787	1521	1521
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	538	81	0	462	91	102	242	48	145	269	194
RTOR Reduction (vph)	0	4	0	0	5	0	0	4	0	0	17	0
Lane Group Flow (vph)	188	615	0	0	548	0	102	286	0	145	446	0
Confl. Peds. (#/hr)	27	43	43	27	8	11	11	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	4	8	5	2	2	1	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	53.8	53.8
Effective Green, g (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	53.8	53.8
Actuated g/C Ratio	0.49	0.49	0.49	0.41	0.40	0.36	0.40	0.36	0.40	0.36	0.36	0.36
Clearance Time (s)	3.0	6.5	6.5	3.0	7.2	7.2	3.0	7.2	3.0	7.2	7.2	7.2
Lane Grp Cap (vph)	242	808	679	679	557	557	347	546	347	546	546	546
v/s Ratio Prot	0.05	c0.37	c0.33	c0.02	0.18	0.02	0.15	0.02	c0.29	0.15	0.15	0.15
v/s Ratio Perm	0.78	0.76	0.81	0.45	0.51	0.42	0.82	0.42	0.82	0.42	0.82	0.82
v/c Ratio	30.7	31.1	39.1	31.3	37.7	32.9	43.5	32.9	43.5	32.9	43.5	43.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	21.4	6.7	10.0	6.3	3.3	3.7	12.7	3.7	12.7	3.7	12.7	12.7
Incremental Delay, d2	52.0	37.8	49.0	37.6	41.0	36.5	56.2	36.5	56.2	36.5	56.2	56.2
Delay (s)	D	D	D	D	D	D	D	D	D	D	D	D
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D
Approach Delay (s)	41.2	49.0	49.0	40.1	40.1	51.5	51.5	40.1	40.1	51.5	51.5	51.5
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	45.5											
HCM 2000 Level of Service	D											
HCM 2000 Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	149.7											
Sum of lost time (s)	19.7											
Intersection Capacity Utilization	99.0%											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

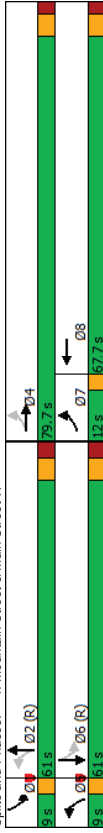
Synchro 11 Report

FB PM (2030)

1: Mountain Street & Main Street W

Queues	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	←	←	←	←	←	←	←	←	←	←	←	←
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	175	500	430	85	95	225	45	135	250	180	180	180
Future Volume (vph)	175	500	430	85	95	225	45	135	250	180	180	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	7.2	7.2	3.0	7.2	3.0	7.2	7.2	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	0.98	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frt	1.00	0.98	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.94	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1599	1654	1661	1661	1552	1621	1521	1621	1521	1621	1521	1521
Flt Permitted	0.20	1.00	1.00	0.26	1.00	0.46	1.00	0.46	1.00	0.46	1.00	1.00
Satd. Flow (perm)	341	1654	1661	449	1552	787	1521	787	1521	787	1521	1521
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	538	81	0	462	91	102	242	48	145	269	194
RTOR Reduction (vph)	0	4	0	0	5	0	0	4	0	0	17	0
Lane Group Flow (vph)	188	615	0	0	548	0	102	286	0	145	446	0
Confl. Peds. (#/hr)	27	43	43	27	8	11	11	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	4	8	5	2	2	1	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	53.8	53.8
Effective Green, g (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	53.8	53.8
Actuated g/C Ratio	0.49	0.49	0.49	0.41	0.40	0.36	0.40	0.36	0.40	0.36	0.36	0.36
Clearance Time (s)	3.0	6.5	6.5	3.0	7.2	7.2	3.0	7.2	3.0	7.2	7.2	7.2
Lane Grp Cap (vph)	242	808	679	679	557	557	347	546	347	546	546	546
v/s Ratio Prot	0.05	c0.37	c0.33	c0.02	0.18	0.02	0.15	0.02	c0.29	0.15	0.15	0.15
v/s Ratio Perm	0.78	0.76	0.81	0.45	0.51	0.42	0.82	0.42	0.82	0.42	0.82	0.82
v/c Ratio	30.7	31.1	39.1	31.3	37.7	32.9	43.5	32.9	43.5	32.9	43.5	43.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	21.4	6.7	10.0	6.3	3.3	3.7	12.7	3.7	12.7	3.7	12.7	12.7
Incremental Delay, d2	52.0	37.8	49.0	37.6	41.0	36.5	56.2	36.5	56.2	36.5	56.2	56.2
Delay (s)	D	D	D	D	D	D	D	D	D	D	D	D
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D
Approach Delay (s)	41.2	49.0	49.0	40.1	40.1	51.5	51.5	40.1	40.1	51.5	51.5	51.5
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	45.5											
HCM 2000 Level of Service	D											
HCM 2000 Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	149.7											
Sum of lost time (s)	19.7											
Intersection Capacity Utilization	99.0%											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

Queues

FB PM (2030)

3. Mountain Street & Elm Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	55	270	70	200	70	280	25	270
Future Volume (vph)	55	270	70	200	70	280	25	270
Lane Group Flow (vph)	56	393	71	219	0	444	0	322
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	8	8	8	2	2	6	6
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.15	0.65	0.29	0.35	0.65	0.65	0.44	0.44
Control Delay	17.0	23.3	20.6	18.3	19.0	19.0	14.6	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	23.3	20.6	18.3	19.0	19.0	14.6	14.6
Queue Length 50th (m)	5.2	40.7	6.9	21.3	42.3	42.3	27.7	27.7
Queue Length 95th (m)	13.1	69.8	17.3	38.2	73.8	73.8	47.6	47.6
Internal Link Dist (m)	56.0	56.0	63.6	63.6	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0						
Base Capacity (vph)	363	605	241	617	682	682	740	740
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.65	0.29	0.35	0.65	0.65	0.44	0.44
Intersection Summary								
Cycle Length: 70.4								
Actuated Cycle Length: 70.4								
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green								
Natural Cycle: 55								
Control Type: Pretimed								

Splits and Phases: 3. Mountain Street & Elm Street



BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

FB PM (2030)

2. Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	0	350	0	0	315
Future Volume (Veh/h)	0	0	350	0	0	315
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	365	0	0	328
Pedestrians	9		1			1
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			73			129
pK, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	703	375			374	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	609	242			241	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
dM capacity (veh/h)	409	711			1187	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	365	328			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1187			
Volume to Capacity	0.00	0.21	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			30.3%			
ICU Level of Service			A			
Analysis Period (min)			15			

BA Group

Synchro 11 Report

Queues

FB PM (2030)

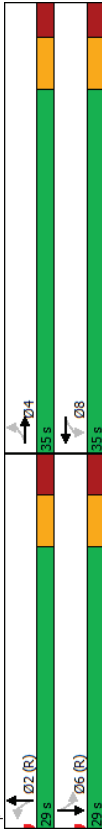
4: Mountain Street & S Service Road/Clarke Street

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Configurations								
Traffic Volume (vph)	145	245	40	160	50	385	35	485
Future Volume (vph)	145	245	40	160	50	385	35	485
Lane Group Flow (vph)	0	495	0	237	52	443	36	572
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		2	6
Permitted Phases	4		8		2		2	6
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Total Split (%)	35.0	35.0	35.0	35.0	29.0	29.0	29.0	29.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	45.3%	45.3%	45.3%	45.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	6.8	6.8	6.8	6.8	7.2	7.2	7.2	7.2
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.79	0.37	0.22	0.22	0.41	0.12	0.12	0.52
Control Delay	26.0	13.2	18.0	16.8	16.0	18.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	26.0	13.2	18.0	16.8	16.0	18.1		
Queue Length 50th (m)	48.0	17.4	4.5	20.6	3.0	27.9		
Queue Length 95th (m)	#99.2	33.0	12.5	32.3	9.0	42.0		
Internal Link Dist (m)	220.5	196.8			357.9	100.3		
Turn Bay Length (m)		140.0			40.0			
Base Capacity (vph)	630	649	239	1082	294	1100		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.79	0.37	0.22	0.22	0.41	0.12	0.12	0.52

Intersection Summary

Cycle Length: 64
 Actuated Cycle Length: 64
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 55
 Control Type: Pretimed
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Mountain Street & S Service Road/Clarke Street



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB PM (2030)

3: Mountain Street & Elm Street

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations												
Traffic Volume (vph)	55	270	115	70	200	15	70	280	85	25	270	20
Future Volume (vph)	55	270	115	70	200	15	70	280	85	25	270	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96	1.00	0.99	1.00	0.99	0.97	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1578	1644	1578	1658	1728	1591	1591	1591	1591	1591	1591	1591
Flt Permitted	0.62	1.00	0.39	1.00	0.39	1.00	0.89	0.89	0.89	0.89	0.89	0.89
Satd. Flow (perm)	1024	1644	681	1728	681	1728	1430	1430	1430	1430	1430	1430
Peak-Hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	56	276	117	71	204	15	71	286	87	26	276	20
RTOR Reduction (vph)	0	22	0	0	4	0	0	12	0	0	3	0
Lane Group Flow (vph)	56	371	0	71	215	0	432	0	0	319	0	7
Confl. Peds. (#/hr)	9	3	3	3	9	7	1	1	1	1	1	1
Heavy Vehicles (%)	4%	0%	3%	0%	0%	0%	3%	8%	0%	0%	5%	0%
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4			8		8		2		6		6
Permitted Phases	4			8		8		2		6		6
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated G/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	363	583	241	613	613	613	670	670	670	670	670	670
v/s Ratio Prot	0.05	0.23	0.12	0.12	0.12	0.12	0.30	0.30	0.30	0.30	0.30	0.30
v/s Ratio Perm	0.15	0.64	0.29	0.35	0.35	0.35	0.64	0.64	0.64	0.64	0.64	0.64
v/c Ratio	0.15	0.64	0.29	0.35	0.35	0.35	0.64	0.64	0.64	0.64	0.64	0.64
Uniform Delay, d1	15.5	18.9	16.3	16.7	16.7	16.7	14.2	14.2	14.2	14.2	14.2	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	5.2	3.1	1.6	1.6	1.6	4.7	4.7	4.7	4.7	4.7	4.7
Delay (s)	16.4	24.2	19.4	18.3	18.3	18.3	19.0	19.0	19.0	19.0	19.0	19.0
Level of Service	B	C	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	23.2		18.6		19.0		19.0		19.0		14.3	
Approach LOS	C		B		B		B		B		B	

Intersection Summary

HCM 2000 Control Delay: 19.2
 HCM 2000 Level of Service: B
 HCM 2000 Volume to Capacity ratio: 0.64
 Actuated Cycle Length (s): 70.4
 Sum of lost time (s): 12.4
 Intersection Capacity Utilization: 88.7%
 ICU Level of Service: E
 Analysis Period (min): 15
 Critical Lane Group

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5. Mountain Street & Food Basics Driveway/Balsam Lane

FB PM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	15	35	10	20	30	15	310	25	10	270	45
Future Volume (Veh/h)	25	15	35	10	20	30	15	310	25	10	270	45
Sign Control	Stop											
Grade	0%											
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	26	15	36	10	21	31	15	320	26	10	278	46
Pedestrians	4											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)	0											
Median type	None											
Median storage (veh)	None											
Upstream signal (m)	120											
pX platoon unblocked	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
VC, conflicting volume	744	705	309	736	715	352	328				350	
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
IC, unblocked vol	720	679	309	710	689	314	328				312	
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
ICF (s)	91	96	95	97	94	96	99				99	
CM capacity (veh/h)	294	355	731	304	350	696	1239				1215	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	77	62	361	334								
Volume Left	26	10	15	10								
Volume Right	36	31	26	46								
cSH	428	451	1239	1215								
Volume to Capacity	0.18	0.14	0.01	0.01								
Queue Length 95th (m)	5.2	3.8	0.3	0.2								
Control Delay (s)	15.2	14.2	0.4	0.3								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.2	14.2	0.4	0.3								
Approach LOS	C	B										
Intersection Summary												
Average Delay	2.8											
Intersection Capacity Utilization	42.5%											
Analysis Period (min)	15											

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4. Mountain Street & S Service Road/Clarke Street

FB PM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	245	90	40	160	30	50	385	45	35	485	70
Future Volume (vph)	145	245	90	40	160	30	50	385	45	35	485	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8											
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1671	1671	1667	1667	1667	1667	1625	3139	1658	3180	1658	3180
Flt Permitted	0.83	0.83	0.86	0.86	0.86	0.86	0.41	1.00	0.50	1.00	0.50	1.00
Satd. Flow (perm)	1402	1402	1402	1402	1402	1402	704	3139	865	3180	865	3180
Peak-Hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	253	93	41	165	31	52	397	46	36	500	72
RTOR Reduction (vph)	0	13	0	0	8	0	0	14	0	0	18	0
Lane Group Flow (vph)	0	482	0	0	229	0	52	429	0	36	554	0
Conf. Peds. (#/hr)	1	1	1	1	1	1	3	2	2	2	3	3
Heavy Vehicles (%)	1%	0%	0%	5%	2%	0%	2%	4%	4%	0%	2%	4%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases												
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.2			28.2			21.8			21.8		
Effective Green, g (s)	28.2			28.2			21.8			21.8		
Actuated g/C Ratio	0.44			0.44			0.34			0.34		
Clearance Time (s)	6.8			6.8			7.2			7.2		
Lane Grp Cap (vph)	617			640			239			294		
v/s Ratio Prot							0.16			0.04		
v/s Ratio Perm	c0.34			0.16			0.07			0.12		
v/c Ratio	0.78			0.36			0.22			0.40		
Uniform Delay, d1	15.3			11.9			15.0			14.5		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	9.5			1.6			2.1			0.9		
Delay (s)	24.8			13.4			17.1			15.4		
Level of Service	C			B			B			B		
Approach Delay (s)	24.8			13.4			17.2			18.4		
Approach LOS	C			B			B			B		
Intersection Summary												
HCM 2000 Control Delay	19.2											
HCM 2000 Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	64.0											
Intersection Capacity Utilization	89.2%											
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
1: Mountain Street & Main Street W

FT AM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	135	200	50	0	285	60	80	270	25	65	215	185
Future Volume (vph)	135	200	50	0	285	60	80	270	25	65	215	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5		6.5		3.0	7.2		3.0	7.2		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		0.99		1.00	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		0.98		1.00	0.99	1.00	1.00	1.00	0.93	
Flt Protected	0.95	1.00		1.00		0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1611	1629		1656		1598	1553	1582	1506			
Flt Permitted	0.27	1.00		1.00		0.27	1.00	1.00	0.41	1.00		
Satd. Flow (perm)	459	1629		1656		458	1553	679	1506			
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	165	244	61	0	348	73	98	329	30	79	262	226
RTOR Reduction (vph)	0	6	0	0	5	0	0	2	0	0	21	0
Lane Group Flow (vph)	165	299	0	0	416	0	98	357	0	79	467	0
Confl. Peds. (#/hr)	16	12	12	16	3	3	3	3	3	3	3	3
Confl. Bikes (#/hr)	1			8								
Heavy Vehicles (%)	3%	4%	0%	0%	2%	5%	4%	12%	0%	5%	11%	2%
Turn Type	pm-pt	NA	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	NA	NA
Protected Phases	7	4		8		5	2		1	6		
Permitted Phases	4					2			6			
Actuated Green, G (s)	67.2	67.2		52.2		65.8	59.8		65.8	59.8		
Effective Green, g (s)	67.2	67.2		52.2		65.8	59.8		65.8	59.8		
Actuated g/C Ratio	0.45	0.45		0.35		0.44	0.40		0.44	0.40		
Clearance Time (s)	3.0	6.5		6.5		3.0	7.2		3.0	7.2		
Lane Grp Cap (vph)	298	731		577		247	620		334	601		
v/s Ratio Prot	0.04	0.18		0.25		0.02	0.23		0.01	0.31		
v/s Ratio Perm	0.20			0.16		0.16			0.09			
v/c Ratio	0.55	0.41		0.72		0.40	0.58		0.24	0.78		
Uniform Delay, d1	28.2	27.8		42.4		27.7	35.0		25.6	39.1		
Progression Factor	1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	7.2	1.7		7.6		4.7	3.9		1.7	9.5		
Delay (s)	35.4	29.5		50.0		32.4	38.9		27.3	48.7		
Level of Service	D	C		D		C	D		C	D		
Approach Delay (s)		31.6		50.0			37.5			45.7		
Approach LOS		C		D			D			D		
Intersection Summary												
HCM 2000 Control Delay		41.2		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		149.7		Sum of lost time (s)					19.7			
Intersection Capacity Utilization		90.4%		ICU Level of Service					E			
Analysis Period (min)		15										
c Critical Lane Group												

BA Group

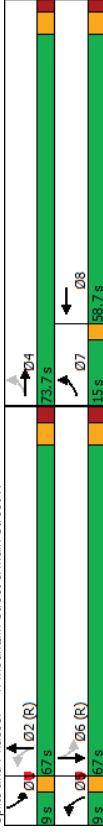
Synchro 11 Report

Queues
1: Mountain Street & Main Street W

FT AM (2030)

Lane Group	EBL	EBT	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	135	200	285	80	270	65	215	185
Future Volume (vph)	135	200	285	80	270	65	215	185
Lane Group Flow (vph)	165	305	421	98	359	79	488	
Turn Type	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	pm-pt
Protected Phases	7	4	8	5	2	1	6	
Permitted Phases	4			2		6		
Minimum Split (s)	9.0	39.5	39.5	9.0	45.2	9.0	45.2	
Total Split (s)	15.0	73.7	58.7	9.0	67.0	9.0	67.0	
Total Split (%)	10.0%	49.2%	39.2%	6.0%	44.8%	6.0%	44.8%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	3.1	0.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	7.2	3.0	7.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
v/c Ratio	0.54	0.41	0.72	0.38	0.58	0.22	0.78	
Control Delay	30.2	29.0	50.0	25.9	39.2	22.6	46.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.2	29.0	50.0	25.9	39.2	22.6	46.7	
Queue Length 50th (m)	29.8	61.3	112.5	16.4	86.0	13.1	124.2	
Queue Length 95th (m)	41.6	77.7	135.5	25.3	106.3	21.2	148.7	
Internal Link Dist (m)		87.2	97.9		57.4		357.9	
Turn Bay Length (m)		15.0		40.0				
Base Capacity (vph)	308	737	583	259	622	353	623	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.54	0.41	0.72	0.38	0.58	0.22	0.78	
Intersection Summary								
Cycle Length: 149.7								
Actuated Cycle Length: 149.7								
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green								
Natural Cycle: 105								
Control Type: Prelimed								

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

Queues

FT AM (2030)

3. Mountain Street & Elm Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	35	115	35	150	70	300	5	195
Future Volume (vph)	35	115	35	150	70	300	5	195
Lane Group Flow (vph)	43	189	43	189	0	524	0	274
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.13	0.33	0.12	0.31	0.79	0.79	0.37	0.37
Control Delay	16.7	16.0	16.5	18.0	26.0	26.0	13.3	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	16.0	16.5	18.0	26.0	26.0	13.3	13.3
Queue Length 50th (m)	4.0	15.7	3.9	18.3	56.1	56.1	22.0	22.0
Queue Length 95th (m)	9.6	27.5	9.5	30.0	82.1	82.1	34.4	34.4
Internal Link Dist (m)	56.0	56.0	63.6	77.7	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0	35.0	607	666	666	733	733
Base Capacity (vph)	332	573	365	607	666	666	733	733
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.33	0.12	0.31	0.79	0.79	0.37	0.37

Intersection Summary

Cycle Length: 70.4

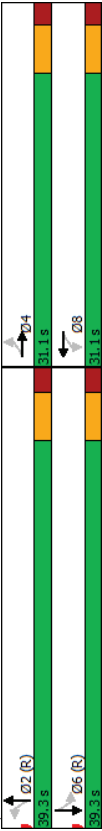
Actuated Cycle Length: 70.4

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Splits and Phases: 3: Mountain Street & Elm Street



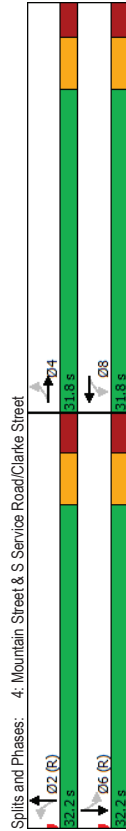
Queues

4: Mountain Street & S Service Road/Clarke Street

FT AM (2030)

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	85	95	60	160	45	395	20	345
Traffic Volume (vph)	85	95	60	160	45	395	20	345
Future Volume (vph)	0	241	0	316	52	494	23	489
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	4	8	2	2	6	6		
Protected Phases	4	8	2	2	6	6		
Permitted Phases	4	8	2	2	6	6		
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Total Split (%)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	7.2	7.2	7.2	7.2	7.2	7.2
Lead/Lag								
Lead-Lag Optimizer?								
v/c Ratio	0.51	0.57	0.19	0.42	0.08	0.08	0.41	
Control Delay	18.6	18.9	15.1	15.1	13.3	13.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	18.6	18.9	15.1	15.1	13.3	13.8		
Queue Length 50th (m)	20.6	27.5	4.1	21.8	1.7	19.8		
Queue Length 95th (m)	38.7	48.2	11.0	32.2	5.8	29.8		
Internal Link Dist (m)	220.5	196.8		357.9	100.3			
Turn Bay Length (m)		140.0			40.0			
Base Capacity (vph)	471	557	276	1173	292	1202		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.51	0.57	0.19	0.42	0.08	0.08	0.41	

Intersection Summary	
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

3: Mountain Street & Elm Street

FT AM (2030)

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	35	115	40	35	150	5	70	300	60	5	195	25
Traffic Volume (vph)	35	115	40	35	150	5	70	300	60	5	195	25
Future Volume (vph)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Ideal Flow (vphpl)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flbb. ped/bikes	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.96	1.00	1.00	1.00	1.00	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1392	1564	1528	1707	1707	1707	1557	1557	1557	1557	1557	1557
Flt Permitted	0.64	1.00	0.64	1.00	1.00	1.00	0.89	0.89	0.89	0.89	0.89	0.89
Satd. Flow (perm)	936	1564	1027	1707	1707	1707	1404	1404	1404	1404	1404	1404
Peak-Hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	140	49	43	183	6	85	366	73	6	238	30
RTOR Reduction (vph)	0	18	0	0	2	0	0	9	0	0	6	0
Lane Group Flow (vph)	43	171	0	43	187	0	0	516	0	0	268	0
Conf. Bikes (#/hr)	8	5	5	8	3	2	2	2	2	2	2	3
Heavy Vehicles (%)	18%	1%	23%	8%	2%	0%	9%	8%	14%	17%	10%	5%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	8	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	332	555	364	606	606	606	668	668	668	668	668	668
v/s Ratio Prot	0.05	0.11	0.11	0.11	0.11	0.11	0.17	0.17	0.17	0.17	0.17	0.17
v/s Ratio Perm	0.13	0.31	0.31	0.12	0.31	0.31	0.78	0.78	0.78	0.78	0.78	0.78
Uniform Delay, d1	15.3	16.4	15.3	16.4	16.4	15.7	12.0	12.0	12.0	12.0	12.0	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.4	0.7	1.3	1.3	0.9	1.4	1.4	1.4	1.4	1.4	1.4
Delay (s)	16.1	17.9	15.9	17.8	17.8	16.6	13.4	13.4	13.4	13.4	13.4	13.4
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	17.6	17.6	17.4	17.4	17.4	17.4	13.4	13.4	13.4	13.4	13.4	13.4
Approach LOS	B	B	B	B	B	B	C	C	C	C	C	C
Intersection Summary												
HCM 2000 Control Delay	19.6	19.6	19.6	19.6	19.6	19.6	12.4	12.4	12.4	12.4	12.4	12.4
HCM 2000 Volume to Capacity ratio	0.58	0.58	0.58	0.58	0.58	0.58	0.78	0.78	0.78	0.78	0.78	0.78
Actuated Cycle Length (s)	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4	70.4
Intersection Capacity Utilization	84.3%	84.3%	84.3%	84.3%	84.3%	84.3%	84.3%	84.3%	84.3%	84.3%	84.3%	84.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

FT AM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	5	0	0	10	10	350	10	20	225	20
Future Volume (Veh/h)	15	0	5	0	0	10	10	350	10	20	225	20
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	18	0	6	0	0	12	12	427	12	24	274	24
Pedestrians	4	4	4	4	4	4	4	4	4	4	4	4
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0	0	0	0	0	0	0
Right turn flare (veh)												
Median type								None				None
Median storage (veh)								120				81
Upstream signal (m)												
pX platoon unblocked	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
VC, conflicting volume	811	805	294	805	811	441	302					443
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VC, unblocked vol	756	750	294	750	756	357	302					359
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
IF (s)	94	100	99	100	100	98	99					98
CM capacity (veh/h)	287	306	745	293	303	637	1266					1118
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	12	451	322								
Volume Left	18	0	12	24								
Volume Right	6	12	12	24								
cSH	339	637	1266	1118								
Volume to Capacity	0.07	0.02	0.01	0.02								
Queue Length 95th (m)	1.8	0.5	0.2	0.5								
Control Delay (s)	16.4	10.8	0.3	0.8								
Lane LOS	C	B	A	A								
Approach Delay (s)	16.4	10.8	0.3	0.8								
Approach LOS	C	B										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			39.3%									
Analysis Period (min)			15									

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

FT AM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	95	30	60	160	55	45	395	35	20	345	80
Future Volume (vph)	85	95	30	60	160	55	45	395	35	20	345	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554	1554
Flt Permitted	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Satd. Flow (perm)	1182	1182	1182	1182	1182	1182	1182	1182	1182	1182	1182	1182
Peak-Hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	98	109	34	69	184	63	52	454	40	23	397	92
RTOR Reduction (vph)	0	9	0	0	14	0	0	10	0	0	31	0
Lane Group Flow (vph)	0	232	0	0	302	0	52	484	0	23	458	0
Conf. Peds. (#/hr)												
Heavy Vehicles (%)	7%	8%	13%	12%	6%	2%	17%	10%	12%	10%	9%	0%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases												
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0			25.0			25.0			25.0		
Effective Green, g (s)	25.0			25.0			25.0			25.0		
Actuated g/C Ratio	0.39			0.39			0.39			0.39		
Clearance Time (s)	6.8			6.8			7.2			7.2		
Lane Grp Cap (vph)	461			543			276			292		
v/s Ratio Prot												
v/s Ratio Perm	0.20			0.22			0.07			0.03		
v/c Ratio	0.50			0.56			0.19			0.08		
Uniform Delay, d1	14.8			15.2			12.8			12.3		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	3.9			4.1			1.5			0.5		
Delay (s)	18.7			19.3			14.3			12.8		
Level of Service	B			B			B			B		
Approach Delay (s)	18.7			19.3			15.2			14.9		
Approach LOS	B			B			B			B		
Intersection Summary												
HCM 2000 Control Delay			16.4									
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			64.0									
Intersection Capacity Utilization			59.8%									
Analysis Period (min)			15									
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FT PM (2030)

1: Mountain Street & Main Street W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	500	80	0	430	85	100	245	45	135	280	180
Future Volume (vph)	175	500	80	0	430	85	100	245	45	135	280	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5			6.5		3.0	7.2		3.0	7.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.98			0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98			0.98		1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1599	1651			1661		1661	1554		1622	1526	
Flt Permitted	0.20	1.00			1.00		0.22	1.00		0.44	1.00	
Satd. Flow (perm)	341	1651			1661		386	1554		743	1526	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	538	86	0	462	91	108	263	48	145	301	194
RTOR Reduction (vph)	0	4	0	0	5	0	0	4	0	0	15	0
Lane Group Flow (vph)	188	620	0	0	548	0	108	307	0	145	480	0
Confl. Peds. (#/hr)	27	43	43		27	8		11	11		8	
Confl. Bikes (#/hr)				1								
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	NA	NA
Protected Phases	7	4		8		5	2		1	6		
Permitted Phases	4					2				6		
Actuated Green, G (s)	73.2	73.2		61.2		59.8	53.8		59.8	53.8		
Effective Green, g (s)	73.2	73.2		61.2		59.8	53.8		59.8	53.8		
Actuated g/C Ratio	0.49	0.49		0.41		0.40	0.36		0.40	0.36		
Clearance Time (s)	3.0	6.5		6.5		3.0	7.2		3.0	7.2		
Lane Grp Cap (vph)	242	807		679		205	558		332	548		
v/s Ratio Prot	0.05	c0.38		c0.33		c0.02	0.20		0.02	c0.31		
v/s Ratio Perm	0.33			0.19		0.19			0.16			
v/c Ratio	0.78	0.77		0.81		0.53	0.55		0.44	0.88		
Uniform Delay, d1	30.7	31.3		39.1		32.9	38.3		33.4	44.8		
Progression Factor	1.00	1.00		1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	21.4	6.9		10.0		9.4	3.9		4.1	17.6		
Delay (s)	52.0	38.2		49.0		42.3	42.1		37.5	62.4		
Level of Service	D	D		D		D	D		D	E		
Approach Delay (s)		41.4		49.0		42.2			56.7			
Approach LOS		D		D		D			E			
Intersection Summary												
HCM 2000 Control Delay		47.3		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		149.7		Sum of lost time (s)					19.7			
Intersection Capacity Utilization		99.0%		ICU Level of Service					F			
Analysis Period (min)		15										
c Critical Lane Group												

BA Group

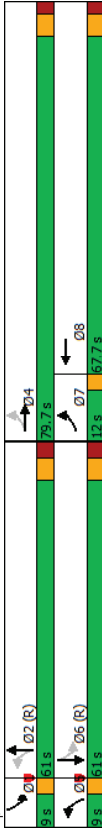
Synchro 11 Report

FT PM (2030)

Queues1: Mountain Street & Main Street W

Lane Group	EBL	EBT	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	175	500	430	100	245	135	280	
Future Volume (vph)	175	500	430	100	245	135	280	
Lane Group Flow (vph)	188	624	553	108	311	145	495	
Turn Type	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	8	5	2	1	6	
Permitted Phases	4			2			6	
Minimum Split (s)	9.0	39.5	39.5	9.0	45.2	9.0	45.2	
Total Split (s)	12.0	79.7	67.7	9.0	61.0	9.0	61.0	
Total Split (%)	8.0%	53.2%	45.2%	6.0%	40.7%	6.0%	40.7%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	3.1	0.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	7.2	3.0	7.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
v/c Ratio	0.75	0.77	0.81	0.50	0.55	0.41	0.88	
Control Delay	41.8	38.7	49.3	34.2	42.0	30.5	60.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.8	38.7	49.3	34.2	42.0	30.5	60.8	
Queue Length 50th (m)	31.7	155.0	149.6	19.7	75.8	27.1	138.8	
Queue Length 95th (m)	#54.8	209.4	202.8	32.9	108.5	42.9	#206.0	
Internal Link Dist (m)		87.2	97.9		57.4		357.9	
Turn Bay Length (m)	15.0		40.0					
Base Capacity (vph)	250	811	684	215	562	351	563	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.75	0.77	0.81	0.50	0.55	0.41	0.88	
Intersection Summary								
Cycle Length: 149.7								
Actuated Cycle Length: 149.7								
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green								
Natural Cycle: 105								
Control Type: Prelimed								
# 95th percentile volume exceeds capacity, queue may be longer.								
Queue shown is maximum after two cycles.								

Splits and Phases: 1: Mountain Street & Main Street W



Queues

3. Mountain Street & Elm Street

FT PM (2030)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	60	270	70	200	70	290	25	280
Future Volume (vph)	60	270	70	200	70	290	25	280
Lane Group Flow (vph)	61	393	71	219	0	454	0	332
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.17	0.65	0.29	0.35	0.66	0.66	0.45	0.45
Control Delay	17.2	23.3	20.6	18.3	19.5	19.5	14.8	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	23.3	20.6	18.3	19.5	19.5	14.8	14.8
Queue Length 50th (m)	5.7	40.7	6.9	21.3	43.7	43.7	28.8	28.8
Queue Length 95th (m)	14.0	69.8	17.3	38.2	76.3	76.3	49.1	49.1
Internal Link Dist (m)	56.0	63.6	63.6	77.7	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0						
Base Capacity (vph)	363	605	241	617	683	683	740	740
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.65	0.29	0.35	0.66	0.66	0.45	0.45

Intersection Summary

Cycle Length: 70.4

Actuated Cycle Length: 70.4

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Splits and Phases: 3: Mountain Street & Elm Street



BA Group

Synchro 11 Report

FT PM (2030)

HCM Unsignalized Intersection Capacity Analysis

2: Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (veh/h)	10	25	350	15	35	315
Future Volume (Veh/h)	10	25	350	15	35	315
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	26	365	16	36	328
Pedestrians	9		1			1
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			73			129
pK, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	783	383			390	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	683	227			235	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	97	96			97	
dM capacity (veh/h)	353	711			1171	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	36	381	364			
Volume Left	10	0	36			
Volume Right	26	16	0			
cSH	554	1700	1171			
Volume to Capacity	0.06	0.22	0.03			
Queue Length 95th (m)	1.7	0.0	0.8			
Control Delay (s)	11.9	0.0	1.1			
Lane LOS	B		A			
Approach Delay (s)	11.9	0.0	1.1			
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			54.8%			
ICU Level of Service						A
Analysis Period (min)			15			

BA Group

Synchro 11 Report

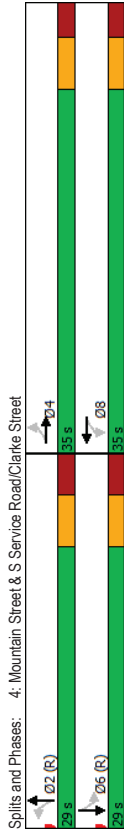
Queues

4: Mountain Street & S Service Road/Clarke Street

FT PM (2030)

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4
Traffic Volume (vph)	145	245	40	160	50	405	35	510
Future Volume (vph)	145	245	40	160	50	405	35	510
Lane Group Flow (vph)	0	500	0	237	52	464	36	598
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Total Split (s)	35.0	35.0	35.0	35.0	29.0	29.0	29.0	29.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	45.3%	45.3%	45.3%	45.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8	6.8	7.2	7.2	7.2	7.2
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.79	0.37	0.23	0.43	0.12	0.12	0.54	0.54
Control Delay	26.2	13.2	18.4	17.1	16.0	18.6	18.6	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.2	13.2	18.4	17.1	16.0	18.6	18.6	18.6
Queue Length 50th (m)	48.4	17.4	4.5	21.8	3.0	29.6	29.6	29.6
Queue Length 95th (m)	#100.5	33.0	12.6	33.9	9.0	44.3	44.3	44.3
Internal Link Dist (m)	220.5	196.8	357.9	357.9	100.3	100.3	100.3	100.3
Turn Bay Length (m)	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0
Base Capacity (vph)	632	649	228	1083	288	1100	1100	1100
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.37	0.23	0.43	0.13	0.13	0.54	0.54

Intersection Summary	
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

3: Mountain Street & Elm Street

FT PM (2030)

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4
Traffic Volume (vph)	60	270	115	70	200	15	70	290
Future Volume (vph)	60	270	115	70	200	15	70	290
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb. ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Fltb. ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96	1.00	0.99	1.00	0.97	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1578	1644	1658	1728	1592	1592	1654	1654
Flt Permitted	0.62	1.00	0.39	1.00	0.89	0.89	0.95	0.95
Satd. Flow (perm)	1024	1644	681	1728	1431	1431	1572	1572
Peak-Hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	61	276	117	71	204	15	71	296
RTOR Reduction (vph)	0	22	0	4	0	0	12	0
Lane Group Flow (vph)	61	371	0	71	215	0	442	0
Confl. Peds. (#/hr)	9	3	3	3	9	7	1	1
Heavy Vehicles (%)	4%	0%	3%	0%	0%	3%	8%	0%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	4	4	8	8	2	2	6	6
Actuated Green, G (s)	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0
Actuated G/C Ratio	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	363	583	241	613	670	670	736	736
v/s Ratio Prot	0.06	0.23	0.10	0.12	0.31	0.31	0.21	0.21
v/s Ratio Perm	0.17	0.64	0.29	0.35	0.66	0.66	0.45	0.45
Uniform Delay, d1	15.6	18.9	16.3	16.7	14.4	14.4	12.6	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	5.2	3.1	1.6	5.0	5.0	2.0	2.0
Delay (s)	16.6	24.2	19.4	18.3	19.4	19.4	14.5	14.5
Level of Service	B	C	B	B	B	B	B	B
Approach Delay (s)	23.1	18.6	18.6	19.4	19.4	19.4	14.5	14.5
Approach LOS	C	C	B	B	B	B	B	B
Intersection Summary								
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B					
HCM 2000 Volume to Capacity ratio	0.65							
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	12.4					
Intersection Capacity Utilization	89.7%	ICU Level of Service	E					
Analysis Period (min)	15							
c Critical Lane Group								

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

FT PM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	15	35	10	20	30	15	335	25	10	305	45
Future Volume (Veh/h)	25	15	35	10	20	30	15	335	25	10	305	45
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	26	15	36	10	21	31	15	345	26	10	314	46
Pedestrians	4	4	4	4	4	4	4	4	4	4	4	4
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0	0	0	0	0	0	0
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC, conflicting volume	806	766	345	796	776	377	364					
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VC, unblocked vol	806	766	345	796	776	377	364					
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
IF (s)	90	95	95	96	93	95	99					
CM capacity (veh/h)	264	326	698	273	322	663	1202					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	77	62	386	370								
Volume Left	26	10	15	10								
Volume Right	36	31	26	46								
cSH	393	417	1202	1191								
Volume to Capacity	0.20	0.15	0.01	0.01								
Queue Length 95th (m)	5.7	4.1	0.3	0.2								
Control Delay (s)	16.4	15.1	0.4	0.3								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.4	15.1	0.4	0.3								
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			44.2%									
Analysis Period (min)			15									

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

FT PM (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	245	95	40	160	30	50	405	45	35	510	70
Future Volume (vph)	145	245	95	40	160	30	50	405	45	35	510	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1670	1670	1670	1670	1670	1670	1670	1670	1670	1670	1670	1670
Flt Permitted	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Satd. Flow (perm)	1402	1402	1402	1402	1402	1402	1402	1402	1402	1402	1402	1402
Peak-Hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	253	98	41	165	31	52	418	46	36	526	72
RTOR Reduction (vph)	0	14	0	0	8	0	0	13	0	0	16	0
Lane Group Flow (vph)	0	486	0	0	229	0	52	451	0	36	582	0
Conf. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1%	0%	0%	5%	2%	0%	2%	4%	4%	0%	2%	4%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases												
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.2			28.2			21.8			21.8		
Effective Green, g (s)	28.2			28.2			21.8			21.8		
Actuated g/C Ratio	0.44			0.44			0.34			0.34		
Clearance Time (s)	6.8			6.8			7.2			7.2		
Lane Grp Cap (vph)	617			640			228			288		
v/s Ratio Prot												
v/s Ratio Perm	c0.35			0.16			0.08			0.04		
v/c Ratio	0.79			0.36			0.23			0.12		
Uniform Delay, d1	15.3			11.9			15.1			14.5		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	9.8			1.6			2.3			0.9		
Delay (s)	25.2			13.4			17.4			15.4		
Level of Service	C			B			B			B		
Approach Delay (s)	25.2			13.4			17.5			18.7		
Approach LOS	C			B			B			B		
Intersection Summary												
HCM 2000 Control Delay			19.4									
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			64.0							14.0		
Intersection Capacity Utilization			90.3%							E		
Analysis Period (min)			15									
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB AM (2035)

1: Mountain Street & Main Street W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	135	220	50	0	315	60	70	270	25	65	220	185
Future Volume (vph)	135	220	50	0	315	60	70	270	25	65	220	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5			6.5		3.0	7.2		3.0	7.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb. ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97			0.98		1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1612	1633			1661		1598	1553		1582	1507	
Flt Permitted	0.23	1.00			1.00		0.27	1.00		0.41	1.00	
Satd. Flow (perm)	392	1633			1661		448	1553		679	1507	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	165	268	61	0	384	73	85	329	30	79	268	226
RTOR Reduction (vph)	0	6	0	0	5	0	0	2	0	0	20	0
Lane Group Flow (vph)	165	323	0	0	452	0	85	357	0	79	474	0
Confl. Peds. (#/hr)	16	12	12	12	16	3	3	3	3	3	3	3
Confl. Bikes (#/hr)	1				8							
Heavy Vehicles (%)	3%	4%	0%	0%	2%	5%	4%	12%	0%	5%	11%	2%
Turn Type	pm-pt	NA	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	NA	NA
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4						2			6		
Actuated Green, G (s)	67.2	67.2			52.2		65.8	59.8		65.8	59.8	
Effective Green, g (s)	67.2	67.2			52.2		65.8	59.8		65.8	59.8	
Actuated g/C Ratio	0.45	0.45			0.35		0.44	0.40		0.44	0.40	
Clearance Time (s)	3.0	6.5			6.5		3.0	7.2		3.0	7.2	
Lane Grp Cap (vph)	273	733			579		243	620		334	601	
v/s Ratio Prot	c0.05	0.20			c0.27		c0.01	0.23		0.01	c0.31	
v/s Ratio Perm	0.22				0.14		0.14			0.09		
v/c Ratio	0.60	0.44			0.78		0.35	0.58		0.24	0.79	
Uniform Delay, d1	29.0	28.3			43.6		27.5	35.0		25.6	39.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.6	1.9			10.1		3.9	3.9		1.7	10.1	
Delay (s)	38.5	30.3			53.7		31.4	38.9		27.3	49.5	
Level of Service	D	C			D		C	D		C	D	
Approach Delay (s)		33.0			53.7			37.5			46.4	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay		42.7			HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		149.7			Sum of lost time (s)					19.7		
Intersection Capacity Utilization		90.4%			ICU Level of Service					E		
Analysis Period (min)		15										
c Critical Lane Group												

BA Group

Synchro 11 Report

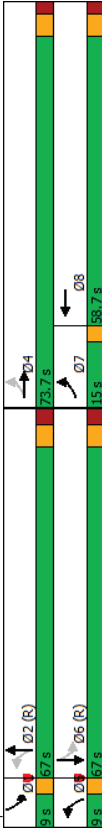
Queues

FB AM (2035)

1: Mountain Street & Main Street W

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	135	220	315	70	270	65	220
Future Volume (vph)	135	220	315	70	270	65	220
Lane Group Flow (vph)	165	329	457	85	359	79	494
Turn Type	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA
Protected Phases	7	4	8	5	2	1	6
Permitted Phases	4			2		6	
Minimum Split (s)	9.0	39.5	39.5	9.0	45.2	9.0	45.2
Total Split (s)	15.0	73.7	58.7	9.0	67.0	9.0	67.0
Total Split (%)	10.0%	49.2%	39.2%	6.0%	44.8%	6.0%	44.8%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	3.0	4.1
All-Red Time (s)	0.0	2.4	2.4	0.0	3.1	0.0	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.5	6.5	3.0	7.2	3.0	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
v/c Ratio	0.59	0.45	0.78	0.33	0.58	0.22	0.79
Control Delay	32.4	29.9	54.0	24.8	39.2	22.6	47.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	29.9	54.0	24.8	39.2	22.6	47.6
Queue Length 50th (m)	29.8	67.7	126.1	14.1	86.0	13.1	127.0
Queue Length 95th (m)	41.6	84.7	150.0	22.2	106.3	21.2	151.8
Internal Link Dist (m)		87.2	97.9		57.4		357.9
Turn Bay Length (m)	15.0			40.0			
Base Capacity (vph)	282	738	583	255	622	353	622
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.45	0.78	0.33	0.58	0.22	0.79
Intersection Summary							
Cycle Length: 149.7							
Actuated Cycle Length: 149.7							
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green							
Natural Cycle: 105							
Control Type: Pretimed							

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

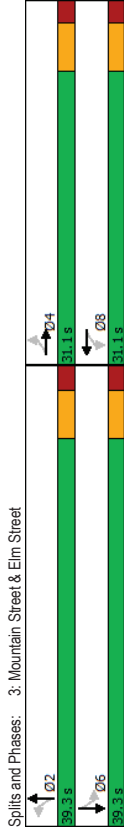
Synchro 11 Report

Queues

3. Mountain Street & Elm Street

FB AM (2035)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	130	35	165	70	320	5	210
Future Volume (vph)	35	130	35	165	70	320	5	210
Lane Group Flow (vph)	43	208	43	207	0	548	0	286
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	8	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
v/c Ratio	0.13	0.36	0.12	0.34	0.82	0.82	0.39	0.39
Control Delay	16.8	17.0	16.5	18.5	28.5	28.5	13.7	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	17.0	16.5	18.5	28.5	28.5	13.7	13.7
Queue Length 50th (m)	4.0	18.2	4.0	20.4	60.6	60.6	23.6	23.6
Queue Length 95th (m)	9.6	30.8	9.5	32.7	#90.4	#90.4	36.4	36.4
Internal Link Dist (m)	56.0	56.0	63.6	63.6	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0						
Base Capacity (vph)	326	576	358	607	667	667	734	734
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.36	0.12	0.34	0.82	0.82	0.39	0.39
Intersection Summary								
Cycle Length: 70.4								
Actuated Cycle Length: 70.4								
Natural Cycle: 60								
Control Type: Semi Act-Uncoord								
# 95th percentile volume exceeds capacity, queue may be longer.								
Queue shown is maximum after two cycles.								



BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

FB AM (2035)

2. Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	360	0	0	235
Future Volume (Veh/h)	0	0	360	0	0	235
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	414	0	0	270
Pedestrians	2	2	5	5	2	2
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0
Right turn flare (veh)						
Median type			None	None	None	None
Median storage (veh)						
Upstream signal (m)			73			129
pK, platoon unblocked	0.80	0.80			0.80	
vC, conflicting volume	691	418			416	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	141			138	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
dM capacity (veh/h)	432	724			1159	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	414	270			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1159			
Volume to Capacity	0.00	0.24	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			31.2%			A
Analysis Period (min)			15			

BA Group

Synchro 11 Report

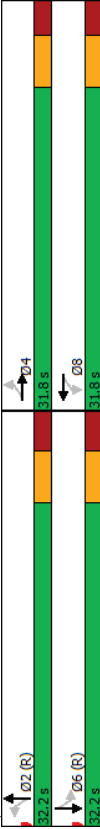
Queues

FB AM (2035)

4: Mountain Street & S Service Road/Clarke Street

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Configurations	EB	EB	WB	WB	NB	NB	SB	SB
Traffic Volume (vph)	85	105	60	175	40	400	20	350
Future Volume (vph)	85	105	60	175	40	400	20	350
Lane Group Flow (vph)	0	253	0	333	46	500	23	494
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6	
Permitted Phases	4		8		2		6	
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Total Split (%)	31.8	31.8	31.8	31.8	32.2	32.2	32.2	32.2
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	7.2	7.2	7.2	7.2	7.2	7.2
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.54	0.60	0.17	0.43	0.08	0.08	0.41	
Control Delay	19.4	19.8	14.8	15.1	13.3	13.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	19.4	19.8	14.8	15.1	13.3	13.8		
Queue Length 50th (m)	22.1	29.6	3.6	22.3	1.7	20.0		
Queue Length 95th (m)	41.1	51.6	9.9	32.7	5.8	30.2		
Internal Link Dist (m)	220.5	196.8		357.9		100.3		
Turn Bay Length (m)		140.0			40.0			
Base Capacity (vph)	469	559	274	1173	291	1202		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.54	0.60	0.17	0.43	0.08	0.41		
Intersection Summary								
Cycle Length: 64								
Actuated Cycle Length: 64								
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green								
Natural Cycle: 55								
Control Type: Prelimed								

Splits and Phases: 4: Mountain Street & S Service Road/Clarke Street



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB AM (2035)

3: Mountain Street & Elm Street

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Movement								
Lane Configurations	EB	EB	WB	WB	NB	NB	SB	SB
Traffic Volume (vph)	35	130	40	35	165	5	70	320
Future Volume (vph)	35	130	40	35	165	5	70	320
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.1	6.1	6.1	6.1	6.3			6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00
Fpb. ped/bikes	1.00	0.99	1.00	1.00	1.00			1.00
Fpb. ped/bikes	0.99	1.00	0.99	1.00	1.00			1.00
Frt	1.00	0.96	1.00	1.00	0.98			0.99
Flt Protected	0.95	1.00	0.95	1.00	0.99			1.00
Satd. Flow (prot)	1392	1578	1528	1707	1559			1572
Flt Permitted	0.63	1.00	0.63	1.00	0.90			0.99
Satd. Flow (perm)	921	1578	1009	1707	1409			1556
Peak-Hour factor, PHF	0.82	0.82	0.82	0.82	0.82			0.82
Adj. Flow (vph)	43	159	49	43	201			256
RTOR Reduction (vph)	0	15	0	0	1			0
Lane Group Flow (vph)	43	193	0	43	206			281
Confl. Peds. (#/hr)	8	5	5	8	3			2
Confl. Bikes (#/hr)	1							3
Heavy Vehicles (%)	18%	1%	23%	8%	2%			10%
Turn Type	Perm	NA	Perm	NA	Perm			NA
Protected Phases	4		8		2			6
Permitted Phases	4		8		2			6
Actuated Green, G (s)	25.0	25.0	25.0	25.0	33.0			33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	33.0			33.0
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.47			0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.3			6.3
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5			2.5
Lane Grp Cap (vph)	327	560	358	606	660			729
v/s Ratio Prot	c0.12		0.04		c0.38			0.18
v/s Ratio Perm	0.05		0.12		0.82			0.39
v/c Ratio	0.13	0.34	0.12	0.34	0.82			0.39
Uniform Delay, d1	15.4	16.7	15.3	16.6	16.1			12.1
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.8	1.7	0.7	1.5	1.08			1.5
Delay (s)	16.2	18.3	16.0	18.2	27.0			13.7
Level of Service	B	B	B	B	C			B
Approach Delay (s)	18.0		17.8		27.0			13.7
Approach LOS	B		B		C			B
Intersection Summary								
HCM 2000 Control Delay		20.7						C
HCM 2000 Volume to Capacity ratio		0.61						
Actuated Cycle Length (s)		70.4						12.4
Intersection Capacity Utilization		85.5%						E
Analysis Period (min)		15						
c Critical Lane Group								

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

FB AM (2035)

5. Mountain Street & Food Basics Driveway/Balsam Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	15	0	5	0	0	10	10	340	10	20	230	20
Future Volume (Veh/h)	15	0	5	0	0	10	10	340	10	20	230	20
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	18	0	6	0	0	12	12	415	12	24	280	24
Pedestrians	4	4	4	4	4	4	4	4	4	4	4	4
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage												
Right turn flare (veh)												
Median type	None											
Median storage (veh)	None											
Upstream signal (m)	120											
pX platoon unblocked	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
VC, conflicting volume	805	799	300	799	805	429	308	308	431	431	431	431
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	671	664	300	664	671	223	308	308	225	225	225	225
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1	4.1	4.1	4.1	4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
p0 queue free %	94	100	99	100	100	98	99	99	98	98	98	98
CM capacity (veh/h)	296	310	739	303	307	685	1260	1260	1133	1133	1133	1133
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	12	439	328								
Volume Left	18	0	12	24								
Volume Right	6	12	12	24								
cSH	349	685	1260	1133								
Volume to Capacity	0.07	0.02	0.01	0.02								
Queue Length 95th (m)	1.8	0.4	0.2	0.5								
Control Delay (s)	16.1	10.4	0.3	0.8								
Lane LOS	C	B	A	A								
Approach Delay (s)	16.1	10.4	0.3	0.8								
Approach LOS	C	B	A	A								
Intersection Summary												
Average Delay	1.1											
Intersection Capacity Utilization	39.5%											
Analysis Period (min)	15											
A												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB AM (2035)

4. Mountain Street & S Service Road/Clarke Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	105	30	60	175	55	40	400	35	20	350	80
Future Volume (vph)	85	105	30	60	175	55	40	400	35	20	350	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1557	1557	1557	1557	1557	1557	1557	1557	1557	1557	1557	1557
Flt Permitted	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Satd. Flow (perm)	1181	1181	1181	1181	1181	1181	1181	1181	1181	1181	1181	1181
Peak-Hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	98	121	34	69	201	63	46	460	40	23	402	92
RTOR Reduction (vph)	0	9	0	0	13	0	0	10	0	0	31	0
Lane Group Flow (vph)	0	244	0	0	320	0	46	490	0	23	463	0
Conf. Peds. (#/hr)	7%	8%	13%	12%	6%	2%	17%	10%	12%	10%	9%	0%
Heavy Vehicles (%)	7%	8%	13%	12%	6%	2%	17%	10%	12%	10%	9%	0%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lane Grp Cap (vph)	461	461	461	546	546	546	274	1162	291	1171	1171	1171
v/s Ratio Prot	0.21	0.21	0.21	0.23	0.23	0.23	0.07	0.16	0.03	0.15	0.15	0.15
v/s Ratio Perm	0.53	0.53	0.53	0.59	0.59	0.59	0.17	0.42	0.08	0.40	0.40	0.40
Uniform Delay, d1	15.0	15.0	15.0	15.4	15.4	15.4	12.7	14.2	12.3	14.1	14.1	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	4.3	4.3	4.5	4.5	4.5	1.3	1.1	0.5	1.0	1.0	1.0
Delay (s)	19.3	19.3	19.3	19.9	19.9	19.9	14.0	15.3	12.8	15.1	15.1	15.1
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	19.3	19.3	19.3	19.9	19.9	19.9	15.2	15.2	15.2	15.0	15.0	15.0
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	16.7											
HCM 2000 Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	64.0											
Intersection Capacity Utilization	60.9%											
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB PM (2035)

1: Mountain Street & Main Street W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	175	555	75	0	475	85	95	250	45	135	275	180
Future Volume (vph)	175	555	75	0	475	85	95	250	45	135	275	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.98	1.00	0.98	1.00	0.94
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1599	1660	1666	1666	1666	1666	1661	1554	1622	1525	1622	1525
Flt Permitted	0.16	1.00	1.00	1.00	0.23	1.00	0.23	1.00	0.43	1.00	0.43	1.00
Satd. Flow (perm)	266	1660	1660	1666	1666	1666	396	1554	730	1625	730	1625
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	597	81	0	511	91	102	269	48	145	296	194
RTOR Reduction (vph)	0	3	0	0	4	0	0	4	0	4	0	16
Lane Group Flow (vph)	188	675	0	0	598	0	102	313	0	145	474	0
Confl. Peds. (#/hr)	27	43	43	27	8	27	8	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	4	8	5	2	2	1	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Effective Green, g (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Actuated g/C Ratio	0.49	0.49	0.49	0.41	0.40	0.36	0.40	0.36	0.40	0.36	0.40	0.36
Clearance Time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Grp Cap (vph)	210	811	681	681	208	558	208	558	327	548	327	548
v/s Ratio Prot	d0.05	0.41	0.36	d0.02	0.20	0.18	d0.02	0.20	0.18	d0.31	0.16	0.16
v/s Ratio Perm	d0.38	0.83	0.88	0.88	0.49	0.56	0.49	0.56	0.44	0.86	0.44	0.86
Uniform Delay, d1	33.0	33.0	33.0	40.8	31.9	38.5	31.9	38.5	33.6	44.6	33.6	44.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.7	9.8	14.9	14.9	8.0	4.0	8.0	4.0	4.3	16.5	4.3	16.5
Delay (s)	72.8	42.7	55.7	55.7	39.9	42.5	39.9	42.5	37.9	61.1	37.9	61.1
Level of Service	E	D	E	E	D	D	D	D	D	E	D	E
Approach Delay (s)	49.2	49.2	49.2	55.7	41.9	41.9	41.9	41.9	41.9	55.8	41.9	55.8
Approach LOS	D	D	D	E	D	D	D	D	D	E	D	E
Intersection Summary												
HCM 2000 Control Delay	51.2											
HCM 2000 Level of Service	D											
HCM 2000 Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	149.7											
Sum of lost time (s)	19.7											
Intersection Capacity Utilization	101.5%											
ICU Level of Service	G											
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

Synchro 11 Report

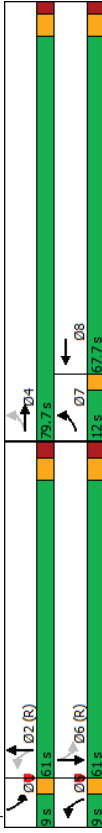
FB PM (2035)

1: Mountain Street & Main Street W

Queues

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	175	555	75	0	475	85	95	250	45	135	275	180
Future Volume (vph)	175	555	75	0	475	85	95	250	45	135	275	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.98	1.00	0.98	1.00	0.94
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1599	1660	1666	1666	1666	1666	1661	1554	1622	1525	1622	1525
Flt Permitted	0.16	1.00	1.00	1.00	0.23	1.00	0.23	1.00	0.43	1.00	0.43	1.00
Satd. Flow (perm)	266	1660	1660	1666	1666	1666	396	1554	730	1625	730	1625
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	597	81	0	511	91	102	269	48	145	296	194
RTOR Reduction (vph)	0	3	0	0	4	0	0	4	0	4	0	16
Lane Group Flow (vph)	188	675	0	0	598	0	102	313	0	145	474	0
Confl. Peds. (#/hr)	27	43	43	27	8	27	8	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	NA
Protected Phases	7	4	4	8	5	2	2	1	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Effective Green, g (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Actuated g/C Ratio	0.49	0.49	0.49	0.41	0.40	0.36	0.40	0.36	0.40	0.36	0.40	0.36
Clearance Time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Grp Cap (vph)	210	811	681	681	208	558	208	558	327	548	327	548
v/s Ratio Prot	d0.05	0.41	0.36	d0.02	0.20	0.18	d0.02	0.20	0.18	d0.31	0.16	0.16
v/s Ratio Perm	d0.38	0.83	0.88	0.88	0.49	0.56	0.49	0.56	0.44	0.86	0.44	0.86
Uniform Delay, d1	33.0	33.0	33.0	40.8	31.9	38.5	31.9	38.5	33.6	44.6	33.6	44.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.7	9.8	14.9	14.9	8.0	4.0	8.0	4.0	4.3	16.5	4.3	16.5
Delay (s)	72.8	42.7	55.7	55.7	39.9	42.5	39.9	42.5	37.9	61.1	37.9	61.1
Level of Service	E	D	E	E	D	D	D	D	D	E	D	E
Approach Delay (s)	49.2	49.2	49.2	55.7	41.9	41.9	41.9	41.9	41.9	55.8	41.9	55.8
Approach LOS	D	D	D	E	D	D	D	D	D	E	D	E
Intersection Summary												
Cycle Length: 149.7												
Actuated Cycle Length: 149.7												
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 105												
Control Type: Prelimed												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

Queues

3. Mountain Street & Elm Street

FB PM (2035)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	55	300	70	220	70	305	25	295
Future Volume (vph)	55	300	70	220	70	305	25	295
Lane Group Flow (vph)	56	423	71	239	0	469	0	347
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	6		
Permitted Phases	4	8	8	2	2	6		
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.16	0.70	0.32	0.39	0.69	0.69	0.47	0.47
Control Delay	17.1	25.4	21.7	18.9	20.3	20.3	15.1	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	25.4	21.7	18.9	20.3	20.3	15.1	15.1
Queue Length 50th (m)	5.2	45.7	7.0	23.7	46.0	46.0	30.4	30.4
Queue Length 95th (m)	13.1	77.6	17.8	41.8	80.3	80.3	51.7	51.7
Internal Link Dist (m)	56.0	56.0	63.6	63.6	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0						
Base Capacity (vph)	347	606	219	617	682	682	741	741
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.70	0.32	0.39	0.69	0.69	0.47	0.47

Intersection Summary

Cycle Length: 70.4

Actuated Cycle Length: 70.4

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Splits and Phases: 3. Mountain Street & Elm Street



BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

2. Mountain Street & Site Driveway

FB PM (2035)

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (veh/h)	0	0	375	0	0	340
Future Volume (Veh/h)	0	0	375	0	0	340
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	391	0	0	354
Pedestrians	9		1			1
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			73			129
pK, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	755	401			400	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	631	218			216	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
dM capacity (veh/h)	381	703			1161	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	391	354			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1161			
Volume to Capacity	0.00	0.23	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			31.8%			A
Analysis Period (min)			15			

BA Group

Synchro 11 Report

Queues

FB PM (2035)

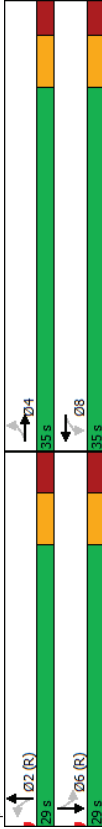
4: Mountain Street & S Service Road/Clarke Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	145	270	40	175	50	410	35	510
Future Volume (vph)	145	270	40	175	50	410	35	510
Lane Group Flow (vph)	0	520	0	252	52	469	36	598
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4		8		2		6	
Permitted Phases	4		8		2		6	
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Total Split (%)	35.0	35.0	35.0	35.0	29.0	29.0	29.0	29.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	45.3%	45.3%	45.3%	45.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8	6.8	7.2	7.2	7.2	7.2
Lead/Lag								
Lead-Lag Optimizer?								
v/c Ratio	0.82	0.39	0.23	0.43	0.13	0.13	0.13	0.54
Control Delay	28.6	13.5	18.4	17.1	16.0	18.6		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	28.6	13.5	18.4	17.1	16.0	18.6		
Queue Length 50th (m)	51.8	18.9	4.5	22.2	3.0	29.6		
Queue Length 95th (m)	#107.0	35.3	12.6	34.2	9.0	44.3		
Internal Link Dist (m)	220.5	196.8		357.9		100.3		
Turn Bay Length (m)		140.0			40.0			
Base Capacity (vph)	633	654	228	1083	287	1100		
Starvation Cap Reductn	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		
Reduced v/c Ratio	0.82	0.39	0.23	0.43	0.13	0.13		

Intersection Summary

Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Mountain Street & S Service Road/Clarke Street



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FB PM (2035)

3: Mountain Street & Elm Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	300	115	70	220	15	70	305	85	25	295	20
Future Volume (vph)	55	300	115	70	220	15	70	305	85	25	295	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96	1.00	0.99	1.00	0.99	0.97	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1579	1662	1579	1658	1729	1593	1593	1655	1593	1655	1593	1655
Flt Permitted	0.59	1.00	0.35	1.00	0.35	1.00	0.89	0.89	0.89	0.89	0.89	0.89
Satd. Flow (perm)	979	1652	617	1729	1431	1431	1431	1652	979	1652	617	1729
Peak-Hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	56	306	117	71	224	15	71	311	87	26	301	20
RTOR Reduction (vph)	0	19	0	0	3	0	0	12	0	0	3	0
Lane Group Flow (vph)	56	404	0	71	236	0	0	457	0	0	344	0
Confl. Peds. (#/hr)	9	3	3	3	9	7	1	1	1	1	7	7
Heavy Vehicles (%)	4%	0%	3%	0%	0%	3%	8%	0%	0%	0%	5%	0%
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	4			8		8		2		6		6
Permitted Phases	4			8		8		2		6		6
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated G/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	347	886	219	613	613	613	670	670	670	670	670	670
v/s Ratio Prot	c0.24			0.14		0.14						
v/s Ratio Perm	0.06	0.16	0.69	0.32	0.38	0.38	0.32	0.32	0.32	0.32	0.32	0.32
v/c Ratio	0.16	0.69	0.32	0.38	0.38	0.38	0.32	0.32	0.32	0.32	0.32	0.32
Uniform Delay, d1	15.5	19.4	16.5	17.0	17.0	17.0	14.6	14.6	14.6	14.6	14.6	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	6.5	3.9	1.8	1.8	1.8	5.6	5.6	5.6	5.6	5.6	5.6
Delay (s)	16.5	25.9	20.4	18.8	18.8	18.8	20.2	20.2	20.2	20.2	20.2	20.2
Level of Service	B	C	C	B	B	B	C	C	C	C	C	C
Approach Delay (s)	24.8			19.2		19.2	20.2	20.2	20.2	20.2	20.2	20.2
Approach LOS	C			B		B	C	C	C	C	C	C

Intersection Summary												
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C									
HCM 2000 Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	12.4									
Intersection Capacity Utilization	92.8%	ICU Level of Service	F									
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

FB PM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	15	35	10	20	30	15	335	25	10	295	45
Future Volume (Veh/h)	25	15	35	10	20	30	15	335	25	10	295	45
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	26	15	36	10	21	31	15	345	26	10	304	46
Pedestrians	4	4	4	4	4	4	4	4	4	4	4	4
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0	0	0	0	0	0	0
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
VC, conflicting volume	796	756	335	786	766	377	354	354	375	375	375	375
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
IC, unblocked vol	725	681	335	715	692	264	354	354	282	282	282	282
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1	4.1	4.1	4.1	4.1
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2	2.2	2.2	2.2	2.2
CM capacity (veh/h)	90	95	95	96	94	96	99	99	99	99	99	99
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	77	62	386	360								
Volume Left	26	10	15	10								
Volume Right	36	31	26	46								
cSH	402	430	1212	1190								
Volume to Capacity	0.19	0.14	0.01	0.01								
Queue Length 95th (m)	5.6	4.0	0.3	0.2								
Control Delay (s)	16.1	14.8	0.4	0.3								
Lane LOS	C	B	A	A								
Approach Delay (s)	16.1	14.8	0.4	0.3								
Approach LOS	C	B										
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization			44.1%									
Analysis Period (min)			15									

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

FB PM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	270	90	40	175	30	50	410	45	35	510	70
Future Volume (vph)	145	270	90	40	175	30	50	410	45	35	510	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1675	1675	1675	1675	1675	1675	1625	3143	1659	3183	1659	3183
Flt Permitted	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Satd. Flow (perm)	1408	1408	1408	1408	1408	1408	1408	1408	1408	1408	1408	1408
Peak-Hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	278	93	41	180	31	52	423	46	36	526	72
RTOR Reduction (vph)	0	12	0	0	8	0	0	13	0	0	16	0
Lane Group Flow (vph)	0	508	0	0	244	0	52	456	0	36	582	0
Conf. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1%	0%	0%	5%	2%	0%	2%	4%	4%	0%	2%	4%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases												
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.2			28.2			21.8			21.8		
Effective Green, g (s)	28.2			28.2			21.8			21.8		
Actuated g/C Ratio	0.44			0.44			0.34			0.34		
Clearance Time (s)	6.8			6.8			7.2			7.2		
Lane Grp Cap (vph)	620			646			228			287		
v/s Ratio Prot												
v/s Ratio Perm	c0.36			0.17			0.08			0.04		
v/c Ratio	0.82			0.38			0.23			0.13		
Uniform Delay, d1	15.7			12.0			15.1			14.5		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	11.5			1.7			2.3			0.9		
Delay (s)	27.2			13.7			17.4			15.4		
Level of Service	C			B			B			B		
Approach Delay (s)	27.2			13.7			17.5			18.7		
Approach LOS	C			B			B			B		
Intersection Summary												
HCM 2000 Control Delay				20.0			HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio				0.70								
Actuated Cycle Length (s)				64.0			Sum of lost time (s)			14.0		
Intersection Capacity Utilization				92.2%			ICU Level of Service			F		
Analysis Period (min)				15								
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
1: Mountain Street & Main Street W

FT AM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	135	220	50	0	315	60	80	295	25	65	235	185
Future Volume (vph)	135	220	50	0	315	60	80	295	25	65	235	185
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5			6.5		3.0	7.2		3.0	7.2	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99			0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97			0.98		1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1612	1633			1661		1598	1554		1582	1510	
Flt Permitted	0.23	1.00			1.00		0.25	1.00		0.37	1.00	
Satd. Flow (perm)	392	1633			1661		416	1554		623	1510	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	165	268	61	0	384	73	98	360	30	79	287	226
RTOR Reduction (vph)	0	6	0	0	5	0	0	2	0	0	19	0
Lane Group Flow (vph)	165	323	0	0	452	0	98	388	0	79	494	0
Confl. Peds. (#/hr)	16	12	12	12	16	3	3	3	3	3	3	3
Confl. Bikes (#/hr)	1				8							
Heavy Vehicles (%)	3%	4%	0%	0%	2%	5%	4%	12%	0%	5%	11%	2%
Turn Type	pm-pt	NA	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	NA	NA
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4						2			6		
Actuated Green, G (s)	67.2	67.2			52.2		65.8	59.8		65.8	59.8	
Effective Green, g (s)	67.2	67.2			52.2		65.8	59.8		65.8	59.8	
Actuated g/C Ratio	0.45	0.45			0.35		0.44	0.40		0.44	0.40	
Clearance Time (s)	3.0	6.5			6.5		3.0	7.2		3.0	7.2	
Lane Grp Cap (vph)	273	733			579		230	620		312	603	
v/s Ratio Prot	0.05	0.20			0.27		0.02	0.25		0.01	0.33	
v/s Ratio Perm	0.22						0.17			0.10		
v/c Ratio	0.60	0.44			0.78		0.43	0.63		0.25	0.82	
Uniform Delay, d1	29.0	28.3			43.6		28.2	36.0		25.9	40.1	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.6	1.9			10.1		5.7	4.7		1.9	11.8	
Delay (s)	38.5	30.3			53.7		33.9	40.7		27.8	51.9	
Level of Service	D	C			D		C	D		C	D	
Approach Delay (s)	33.0				53.7		39.3			48.7		
Approach LOS	C				D		D			D		
Intersection Summary												
HCM 2000 Control Delay												
HCM 2000 Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
c Critical Lane Group												

BA Group

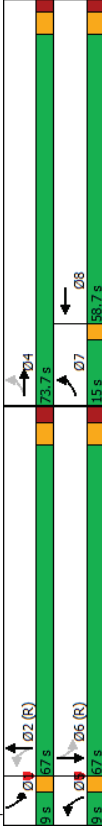
Synchro 11 Report

Queues
1: Mountain Street & Main Street W

FT AM (2035)

Lane Group	EBL	EBT	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	135	220	315	80	295	65	235	185
Future Volume (vph)	135	220	315	80	295	65	235	185
Lane Group Flow (vph)	165	329	457	98	390	79	513	
Turn Type	pm-pt	NA	NA	pm-pt	NA	pm-pt	NA	pm-pt
Protected Phases	7	4	8	5	2	1	6	
Permitted Phases	4			2		6		
Minimum Split (s)	9.0	39.5	39.5	9.0	45.2	9.0	45.2	
Total Split (s)	15.0	73.7	58.7	9.0	67.0	9.0	67.0	
Total Split (%)	10.0%	49.2%	39.2%	6.0%	44.8%	6.0%	44.8%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	3.1	0.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	7.2	3.0	7.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
v/c Ratio	0.59	0.45	0.78	0.41	0.63	0.24	0.82	
Control Delay	32.4	29.9	54.0	26.8	41.2	22.8	50.2	
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0	
Total Delay	32.4	29.9	54.0	26.8	42.0	22.8	50.2	
Queue Length 50th (m)	29.8	67.7	126.1	16.4	96.3	13.1	135.3	
Queue Length 95th (m)	41.6	84.7	150.0	25.3	117.4	21.2	161.0	
Internal Link Dist (m)		87.2	97.9		57.4		357.9	
Turn Bay Length (m)				40.0				
Base Capacity (vph)	282	738	583	241	622	329	622	
Starvation Cap Reductn	0	0	0	0	66	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.59	0.45	0.78	0.41	0.70	0.24	0.82	
Intersection Summary								
Cycle Length: 149.7								
Actuated Cycle Length: 149.7								
Offset: 0 (0%), Referenced to phase 2(NBTL and 6(SBTL), Start of Green								
Natural Cycle: 105								
Control Type: Prelimed								

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

Queues

3. Mountain Street & Elm Street

FT AM (2035)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	35	130	35	165	70	325	5	215
Future Volume (vph)	35	130	35	165	70	325	5	215
Lane Group Flow (vph)	43	208	43	207	0	554	0	298
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.13	0.36	0.12	0.34	0.83	0.83	0.41	0.41
Control Delay	16.8	17.0	16.5	18.5	29.3	29.3	13.9	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	17.0	16.5	18.5	29.3	29.3	13.9	13.9
Queue Length 50th (m)	4.0	18.2	4.0	20.4	61.7	61.7	24.6	24.6
Queue Length 95th (m)	9.6	30.8	9.5	32.7	#94.0	37.8	37.8	37.8
Internal Link Dist (m)	56.0	56.0	63.6	63.6	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0	35.0	35.0	667	667	733	733
Base Capacity (vph)	326	576	358	607	667	667	733	733
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.36	0.12	0.34	0.83	0.83	0.41	0.41

Intersection Summary

Cycle Length: 70.4

Actuated Cycle Length: 70.4

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



BA Group

Synchro 11 Report

FT AM (2035)

HCM Unsignalized Intersection Capacity Analysis

2. Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	10	35	360	5	15	235
Future Volume (Veh/h)	10	35	360	5	15	235
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	11	40	414	6	17	270
Pedestrians	2	2	5	5	2	2
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0
Right turn flare (veh)						
Median type			None	None	None	None
Median storage (veh)						
Upstream signal (m)			73			129
pK, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	728	421			422	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520	131			132	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	97	94			99	
dM capacity (veh/h)	401	726			1153	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	51	420	287			
Volume Left	11	0	17			
Volume Right	40	6	0			
cSH	618	1700	1153			
Volume to Capacity	0.08	0.25	0.01			
Queue Length 95th (m)	2.2	0.0	0.4			
Control Delay (s)	11.3	0.0	0.6			
Lane LOS	B	B	A			
Approach Delay (s)	11.3	0.0	0.6			
Approach LOS	B	B	A			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			37.4%			
Analysis Period (min)			15			
ICU Level of Service			A			

BA Group

Synchro 11 Report

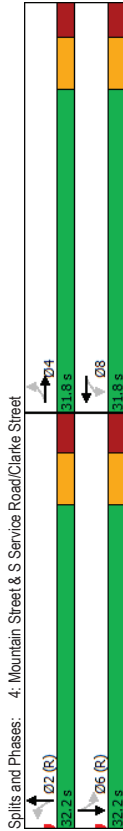
Queues

FT AM (2035)

4: Mountain Street & S Service Road/Clarke Street

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Configurations	85	105	60	175	45	420	20	365
Traffic Volume (vph)	85	105	60	175	45	420	20	365
Future Volume (vph)	0	253	0	333	52	523	23	512
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	4	8	8	2	2	6	6	6
Protected Phases	4	8	8	2	2	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2
Total Split (s)	31.8	31.8	31.8	31.8	32.2	32.2	32.2	32.2
Total Split (%)	49.7%	49.7%	49.7%	49.7%	50.3%	50.3%	50.3%	50.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8	6.8	7.2	7.2	7.2	7.2
Lead/Lag								
Lead-Lag Optimizer?								
v/c Ratio	0.54	0.60	0.19	0.45	0.08	0.08	0.43	0.43
Control Delay	19.4	19.8	15.2	15.4	13.3	14.2	14.2	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	19.8	15.2	15.4	13.3	14.2	14.2	14.2
Queue Length 50th (m)	22.1	29.6	4.1	23.5	1.7	21.2	21.2	21.2
Queue Length 95th (m)	41.1	51.6	11.0	34.4	5.8	31.5	31.5	31.5
Internal Link Dist (m)	220.5	196.8		357.9		100.3		
Turn Bay Length (m)		140.0		40.0				
Base Capacity (vph)	469	559	269	1173	284	1201		
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.60	0.19	0.45	0.08	0.08	0.43	0.43

Intersection Summary
 Cycle Length: 64
 Actuated Cycle Length: 64
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 55
 Control Type: Pretimed



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FT AM (2035)

3: Mountain Street & Elm Street

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	35	130	40	35	165	5	70	325	60	5	215	25
Traffic Volume (vph)	35	130	40	35	165	5	70	325	60	5	215	25
Future Volume (vph)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Ideal Flow (vphpl)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flbb. ped/bikes	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.98	1.00	0.99	1.00	0.99
Frt	1.00	0.96	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	1.00	0.99
Satd. Flow (prot)	1392	1578	1528	1707	1528	1707	1560	1560	1560	1560	1560	1560
Flt Permitted	0.63	1.00	0.63	1.00	0.63	1.00	0.89	0.89	0.89	0.89	0.89	0.89
Satd. Flow (perm)	921	1578	1009	1707	1009	1707	1407	1407	1407	1407	1407	1407
Peak-Hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	43	159	49	43	201	6	85	396	73	6	262	30
RTOR Reduction (vph)	0	15	0	0	1	0	0	8	0	0	6	0
Lane Group Flow (vph)	43	193	0	43	206	0	0	546	0	0	292	0
Confl. Peds. (#/hr)	8	5	5	5	8	3	2	2	2	2	2	3
Confl. Bikes (#/hr)	1											
Heavy Vehicles (%)	18%	1%	23%	8%	2%	0%	9%	8%	14%	17%	10%	5%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3	6.3	6.3
Lane Grp Cap (vph)	327	560	358	606	358	606	669	669	669	669	669	669
v/s Ratio Prot	c0.12			0.12								
v/s Ratio Perm	0.05			0.04			c0.39					
v/c Ratio	0.13	0.34	0.12	0.34	0.12	0.34	0.83	0.40	0.40	0.40	0.40	0.40
Uniform Delay, d1	15.4	16.7	15.3	16.6	15.3	16.6	16.2	12.2	12.2	12.2	12.2	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.7	0.7	1.5	0.7	1.5	11.5	1.7	1.7	1.7	1.7	1.7
Delay (s)	16.2	18.3	16.0	18.2	16.0	18.2	27.7	13.9	13.9	13.9	13.9	13.9
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	18.0			17.8			27.7			13.9		
Approach LOS	B			B			C			B		
Intersection Summary												
HCM 2000 Control Delay							21.0					C
HCM 2000 Volume to Capacity ratio							0.62					
Actuated Cycle Length (s)							70.4					12.4
Intersection Capacity Utilization							85.8%					E
Analysis Period (min)							15					
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

FT AM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	5	0	0	10	10	375	10	20	245	20
Future Volume (Veh/h)	15	0	5	0	0	10	10	375	10	20	245	20
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	18	0	6	0	0	12	12	457	12	24	299	24
Pedestrians	4	4	4	4	4	4	4	4	4	4	4	4
Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Percent Blockage	0	0	0	0	0	0	0	0	0	0	0	0
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
VC, conflicting volume	866	860	319	860	866	471	327					
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	748	741	319	741	748	280	327					
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2					
IF (s)	93	100	99	100	100	98	99					
CM capacity (veh/h)	264	281	722	270	278	640	1240					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	24	12	481	347								
Volume Left	18	0	12	24								
Volume Right	6	12	12	24								
cSH	314	640	1240	1086								
Volume to Capacity	0.08	0.02	0.01	0.02								
Queue Length 95th (m)	2.0	0.5	0.2	0.5								
Control Delay (s)	17.4	10.7	0.3	0.8								
Lane LOS	C	B	A	A								
Approach Delay (s)	17.4	10.7	0.3	0.8								
Approach LOS	C	B										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			40.7%									
Analysis Period (min)			15									

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

FT AM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	105	30	60	175	55	45	420	35	20	365	80
Future Volume (vph)	85	105	30	60	175	55	45	420	35	20	365	80
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1557	1557	1557	1557	1557	1557	1418	2979	1510	3000		
Flt Permitted	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Satd. Flow (perm)	1181	1181	1181	1181	1181	1181	691	2979	728	3000		
Peak-Hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	98	121	34	69	201	63	52	483	40	23	420	92
RTOR Reduction (vph)	0	9	0	0	13	0	0	10	0	0	29	0
Lane Group Flow (vph)	0	244	0	0	320	0	52	513	0	23	483	0
Conf. Peds. (#/hr)							2	1	1	1	2	2
Heavy Vehicles (%)	7%	8%	13%	12%	6%	2%	17%	10%	12%	10%	9%	0%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	NA	NA
Protected Phases												
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0			25.0			25.0			25.0		
Effective Green, g (s)	25.0			25.0			25.0			25.0		
Actuated g/C Ratio	0.39			0.39			0.39			0.39		
Clearance Time (s)	6.8			6.8			7.2			7.2		
Lane Grp Cap (vph)	461			546			269			284		
v/s Ratio Prot												
v/s Ratio Perm	0.21			0.23			0.08			0.03		
v/c Ratio	0.53			0.59			0.19			0.08		
Uniform Delay, d1	15.0			15.4			12.9			14.2		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	4.3			4.5			1.6			0.6		
Delay (s)	19.3			19.9			14.4			15.2		
Level of Service	B			B			B			B		
Approach Delay (s)	19.3			19.9			15.5			15.1		
Approach LOS	B			B			B			B		
Intersection Summary												
HCM 2000 Control Delay				16.8			HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio				0.51								
Actuated Cycle Length (s)				64.0			Sum of lost time (s)			14.0		
Intersection Capacity Utilization				61.5%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

FT PM (2035)

1: Mountain Street & Main Street W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	175	555	80	0	475	85	100	270	45	135	305	180
Future Volume (vph)	175	555	80	0	475	85	100	270	45	135	305	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	0.98	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.94
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94
Satd. Flow (prot)	1599	1657	1666	1666	1666	1661	1556	1623	1529	1623	1529	1529
Flt Permitted	0.16	1.00	1.00	1.00	1.00	0.19	1.00	0.40	1.00	0.40	1.00	1.00
Satd. Flow (perm)	266	1657	1666	1666	1666	334	1556	687	1529	687	1529	1529
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	597	86	0	511	91	108	290	48	145	328	194
RTOR Reduction (vph)	0	4	0	0	4	0	0	4	0	4	0	14
Lane Group Flow (vph)	188	679	0	0	598	0	108	334	0	145	508	0
Confl. Peds. (#/hr)	27	43	43	27	8	11	11	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	NA	NA
Protected Phases	7	4	4	8	5	2	2	1	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Effective Green, g (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Actuated g/C Ratio	0.49	0.49	0.41	0.41	0.40	0.36	0.40	0.36	0.40	0.36	0.40	0.36
Clearance Time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Grp Cap (vph)	210	810	681	681	681	559	559	559	559	559	559	559
v/s Ratio Prot	d0.05	0.41	0.36	d0.02	0.21	0.21	0.02	d0.33	0.02	d0.33	0.02	d0.33
v/s Ratio Perm	d0.38	0.84	0.88	0.88	0.88	0.60	0.60	0.47	0.47	0.93	0.47	0.93
v/c Ratio	0.90	33.1	40.8	40.8	33.7	39.1	34.1	46.0	34.1	46.0	34.1	46.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.7	10.1	14.9	14.9	12.6	4.7	5.0	23.8	5.0	23.8	5.0	23.8
Delay (s)	72.8	43.3	55.7	55.7	46.3	43.8	39.1	69.8	39.1	69.8	39.1	69.8
Level of Service	E	D	E	E	D	D	D	E	D	E	D	E
Approach Delay (s)	49.7	49.7	49.7	55.7	55.7	44.4	44.4	63.1	44.4	63.1	44.4	63.1
Approach LOS	D	D	D	E	E	D	D	E	D	E	D	E
Intersection Summary												
HCM 2000 Control Delay	53.6											
HCM 2000 Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	149.7											
Intersection Capacity Utilization	101.5%											
Analysis Period (min)	15											
c Critical Lane Group												

BA Group

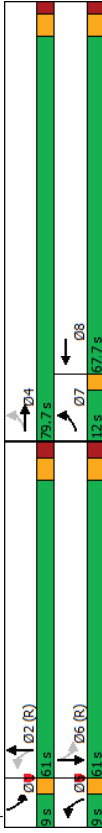
Synchro 11 Report

FT PM (2035)

1: Mountain Street & Main Street W

Queues	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	175	555	80	0	475	85	100	270	45	135	305	180
Future Volume (vph)	175	555	80	0	475	85	100	270	45	135	305	180
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	0.98	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.94
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94
Satd. Flow (prot)	1599	1657	1666	1666	1666	1661	1556	1623	1529	1623	1529	1529
Flt Permitted	0.16	1.00	1.00	1.00	1.00	0.19	1.00	0.40	1.00	0.40	1.00	1.00
Satd. Flow (perm)	266	1657	1666	1666	1666	334	1556	687	1529	687	1529	1529
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	188	597	86	0	511	91	108	290	48	145	328	194
RTOR Reduction (vph)	0	4	0	0	4	0	0	4	0	4	0	14
Lane Group Flow (vph)	188	679	0	0	598	0	108	334	0	145	508	0
Confl. Peds. (#/hr)	27	43	43	27	8	11	11	11	11	11	11	8
Confl. Bikes (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	4%	2%	3%	0%	2%	3%	0%	11%	0%	2%	10%	1%
Turn Type	pm-pt	NA	NA	NA	NA	pm-pt	NA	NA	pm-pt	NA	NA	NA
Protected Phases	7	4	4	8	5	2	2	1	6	6	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Effective Green, g (s)	73.2	73.2	73.2	61.2	59.8	53.8	59.8	53.8	59.8	53.8	59.8	53.8
Actuated g/C Ratio	0.49	0.49	0.41	0.41	0.40	0.36	0.40	0.36	0.40	0.36	0.40	0.36
Clearance Time (s)	3.0	6.5	6.5	6.5	6.5	6.5	3.0	7.2	3.0	7.2	3.0	7.2
Lane Grp Cap (vph)	210	810	681	681	681	559	559	559	559	559	559	559
v/s Ratio Prot	d0.05	0.41	0.36	d0.02	0.21	0.21	0.02	d0.33	0.02	d0.33	0.02	d0.33
v/s Ratio Perm	d0.38	0.84	0.88	0.88	0.88	0.60	0.60	0.47	0.47	0.93	0.47	0.93
v/c Ratio	0.90	33.1	40.8	40.8	33.7	39.1	34.1	46.0	34.1	46.0	34.1	46.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.7	10.1	14.9	14.9	12.6	4.7	5.0	23.8	5.0	23.8	5.0	23.8
Delay (s)	72.8	43.3	55.7	55.7	46.3	43.8	39.1	69.8	39.1	69.8	39.1	69.8
Level of Service	E	D	E	E	D	D	D	E	D	E	D	E
Approach Delay (s)	49.7	49.7	49.7	55.7	55.7	44.4	44.4	63.1	44.4	63.1	44.4	63.1
Approach LOS	D	D	D	E	E	D	D	E	D	E	D	E
Intersection Summary												
HCM 2000 Control Delay	53.6											
HCM 2000 Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	149.7											
Intersection Capacity Utilization	101.5%											
Analysis Period (min)	15											
c Critical Lane Group												

Splits and Phases: 1: Mountain Street & Main Street W



BA Group

Synchro 11 Report

3. Mountain Street & Elm Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	60	300	70	220	70	315	25	305
Future Volume (vph)	60	300	70	220	70	315	25	305
Lane Group Flow (vph)	61	423	71	239	0	479	0	357
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4							
Permitted Phases	8							
Minimum Split (s)	24.1	24.1	24.1	24.1	26.3	26.3	26.3	26.3
Total Split (s)	31.1	31.1	31.1	31.1	39.3	39.3	39.3	39.3
Total Split (%)	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.3	6.3	6.3	6.3
Lead/Lag								
Lead-Lag Optimize?								
v/c Ratio	0.18	0.70	0.32	0.39	0.70	0.70	0.48	0.48
Control Delay	17.4	25.4	21.7	18.9	21.0	21.0	15.3	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	25.4	21.7	18.9	21.0	21.0	15.3	15.3
Queue Length 50th (m)	5.7	45.7	7.0	23.7	47.6	47.6	31.6	31.6
Queue Length 95th (m)	14.1	77.6	17.8	41.8	82.8	82.8	53.6	53.6
Internal Link Dist (m)	56.0	63.6	63.6	77.7	77.7	77.7	48.5	48.5
Turn Bay Length (m)	115.0	35.0						
Base Capacity (vph)	347	606	219	617	681	681	741	741
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.70	0.32	0.39	0.70	0.70	0.48	0.48
Intersection Summary								
Cycle Length: 70.4								
Actuated Cycle Length: 70.4								
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green								
Natural Cycle: 55								
Control Type: Pretimed								

Splits and Phases: 3. Mountain Street & Elm Street



2. Mountain Street & Site Driveway

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	25	375	15	35	340
Future Volume (Veh/h)	10	25	375	15	35	340
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	10	26	391	16	36	354
Pedestrians	9		1		3	1
Lane Width (m)	3.6	3.6	3.6		3.6	3.6
Walking Speed (m/s)	1.2	1.2	1.2		1.2	1.2
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (m)	73					
pK, platoon unblocked	0.85	0.85				
vC, conflicting volume	835	409	416			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	713	209	217			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	97	96	97			
dM capacity (veh/h)	326	701	1144			
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	36	407	390			
Volume Left	10	0	36			
Volume Right	26	16	0			
cSH	531	1700	1144			
Volume to Capacity	0.07	0.24	0.03			
Queue Length 95th (m)	1.7	0.0	0.8			
Control Delay (s)	12.3	0.0	1.1			
Lane LOS	B	A	A			
Approach Delay (s)	12.3	0.0	1.1			
Approach LOS	B					
Intersection Summary						
Average Delay	1.0					
Intersection Capacity Utilization	57.6%					
ICU Level of Service	B					
Analysis Period (min)	15					

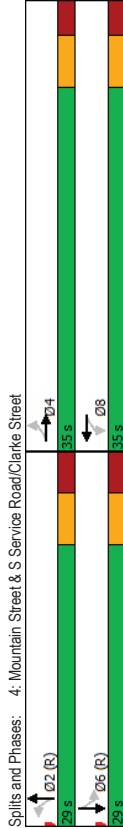
Queues

4: Mountain Street & S Service Road/Clarke Street

FT PM (2035)

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Group									
Lane Configurations									
Traffic Volume (vph)	145	270	40	175	50	430	35	535	
Future Volume (vph)	145	270	40	175	50	430	35	535	
Lane Group Flow (vph)	0	525	0	252	52	489	36	624	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	4		8		2		2	6	
Permitted Phases	4		8		2		2	6	
Minimum Split (s)	31.8	31.8	18.8	18.8	21.2	21.2	21.2	21.2	
Total Split (%)	35.0	35.0	35.0	35.0	29.0	29.0	29.0	29.0	
Total Split (%)	54.7%	54.7%	54.7%	54.7%	45.3%	45.3%	45.3%	45.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.2	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time (s)	6.8	6.8	6.8	6.8	7.2	7.2	7.2	7.2	
Lead/Lag									
Lead-Lag Optimize?									
v/c Ratio	0.83	0.39	0.24	0.24	0.45	0.13	0.13	0.57	
Control Delay	29.2	13.5	18.8	17.4	16.1	19.0	19.0	19.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.2	13.5	18.8	17.4	16.1	19.0	19.0	19.0	
Queue Length 50th (m)	52.6	18.9	4.6	23.4	3.0	31.4	31.4	31.4	
Queue Length 95th (m)	#108.5	35.3	12.8	36.0	9.1	46.6	46.6	46.6	
Internal Link Dist (m)	220.5	196.8		357.9		100.3		100.3	
Turn Bay Length (m)		140.0			40.0				
Base Capacity (vph)	633	654	217	1083	282	1101			
Starvation Cap Reductn	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.83	0.39	0.24	0.24	0.45	0.13	0.13	0.57	

Intersection Summary	
Cycle Length: 64	
Actuated Cycle Length: 64	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

3: Mountain Street & Elm Street

FT PM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	300	115	70	220	15	70	315	85	25	305	20
Future Volume (vph)	60	300	115	70	220	15	70	315	85	25	305	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.1	6.1		6.1	6.1			6.3			6.3	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.96		1.00	0.99			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1579	1662		1658	1729			1594			1655	
Flt Permitted	0.59	1.00		0.35	1.00			0.89			0.95	
Satd. Flow (perm)	979	1652		617	1729			1432			1575	
Peak-hour factor, PHF	0.98	0.98		0.98	0.98			0.98			0.98	
Adj. Flow (vph)	61	306	117	71	224	15	71	321	87	26	311	20
RTOR Reduction (vph)	0	19	0	0	3	0	0	11	0	0	3	0
Lane Group Flow (vph)	61	404	0	71	236	0	0	468	0	0	354	0
Confl. Peds. (#/hr)	9	3	3	3	9	7	1	1	1	1	7	1
Heavy Vehicles (%)	4%	0%	3%	0%	0%	0%	3%	8%	0%	0%	5%	0%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		33.0			33.0		33.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		33.0			33.0		33.0
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47			0.47		0.47
Clearance Time (s)	6.1	6.1		6.1	6.1		6.3			6.3		6.3
Lane Grp Cap (vph)	347	586		219	613		671			738		738
v/s Ratio Prot	c0.24			0.14								
v/s Ratio Perm	0.06	0.12		0.12			c0.33			0.22		0.22
v/c Ratio	0.18	0.69		0.32	0.38		0.70			0.48		0.48
Uniform Delay, d1	15.6	19.4		16.5	17.0		14.8			12.8		12.8
Progression Factor	1.00	1.00		1.00	1.00		1.00			1.00		1.00
Incremental Delay, d2	1.1	6.5		3.9	1.8		5.9			2.2		2.2
Delay (s)	16.7	25.9		20.4	18.8		20.7			15.0		15.0
Level of Service	B	C		C	B		C			B		B
Approach Delay (s)	24.7			19.2			20.7			15.0		15.0
Approach LOS	C			B			C			B		B
Intersection Summary												
HCM 2000 Control Delay	20.4		HCM 2000 Level of Service		C							
HCM 2000 Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	70.4		Sum of lost time (s)		12.4							
Intersection Capacity Utilization	93.7%		ICU Level of Service		F							
Analysis Period (min)	15											
Critical Lane Group												

BA Group

Synchro 11 Report

HCM Unsignalized Intersection Capacity Analysis

5: Mountain Street & Food Basics Driveway/Balsam Lane

FT PM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	25	15	35	10	20	30	15	360	25	10	330	45
Future Volume (Veh/h)	25	15	35	10	20	30	15	360	25	10	330	45
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	26	15	36	10	21	31	15	371	26	10	340	46
Pedestrians	4			4			4			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			0			0			1		
Right turn flare (veh)							None					
Median type							None					
Median storage (veh)												
Upstream signal (m)							120			81		
PX platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
VC, conflicting volume	858	818	371	848	828	403	390			401		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	822	781	371	813	791	343	390			341		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
IF (s)	89	95	95	96	93	95	99			99		
CM capacity (veh/h)	243	303	675	252	299	657	1176			1162		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	77	62	412	396								
Volume Left	26	10	15	10								
Volume Right	36	31	26	46								
cSH	367	394	1176	1162								
Volume to Capacity	0.21	0.16	0.01	0.01								
Queue Length 95th (m)	6.2	4.4	0.3	0.2								
Control Delay (s)	17.4	15.8	0.4	0.3								
Lane LOS	C	C	A	A								
Approach Delay (s)	17.4	15.8	0.4	0.3								
Approach LOS	C	C										
Intersection Summary												
Average Delay				2.8								
Intersection Capacity Utilization				45.8%			ICU Level of Service			A		
Analysis Period (min)				15								

BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

4: Mountain Street & S Service Road/Clarke Street

FT PM (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	270	95	40	175	30	50	430	45	35	535	70
Future Volume (vph)	145	270	95	40	175	30	50	430	45	35	535	70
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.8			6.8			7.2			7.2		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.97	0.97	0.98	0.98	0.98	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1673	1673	1670	1670	1670	1626	3145	1659	3186			
Flt Permitted	0.83	0.83	0.87	0.87	0.87	0.37	1.00	0.47	1.00			
Satd. Flow (perm)	1409	1409	1468	1468	1468	638	3145	827	3186			
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	278	98	41	180	31	52	443	46	36	552	72
RTOR Reduction (vph)	0	13	0	0	8	0	0	13	0	0	16	0
Lane Group Flow (vph)	0	512	0	0	244	0	52	476	0	36	608	0
Conf. Peds. (#/hr)	1	1	1	1	1	3	2	2	2	2	3	3
Heavy Vehicles (%)	1%	0%	0%	5%	2%	0%	2%	4%	4%	0%	2%	4%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	NA	NA
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.2			28.2			21.8			21.8		
Effective Green, g (s)	28.2			28.2			21.8			21.8		
Actuated g/C Ratio	0.44			0.44			0.34			0.34		
Clearance Time (s)	6.8			6.8			7.2			7.2		
Lane Grp Cap (vph)	620			646			217			281		
v/s Ratio Prot							0.15			0.19		
v/s Ratio Perm	c0.36			0.17			0.08			0.04		
v/c Ratio	0.83			0.38			0.24			0.13		
Uniform Delay, d1	15.7			12.0			15.1			14.5		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	12.0			1.7			2.6			0.9		
Delay (s)	27.7			13.7			17.7			15.5		
Level of Service	C			B			B			B		
Approach Delay (s)	27.7			13.7			17.7			19.1		
Approach LOS	C			B			B			B		
Intersection Summary												
HCM 2000 Control Delay	20.3			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	64.0			Sum of lost time (s)			14.0					
Intersection Capacity Utilization	93.3%			ICU Level of Service			F					
Analysis Period (min)	15											
Critical Lane Group												

BA Group

Synchro 11 Report

Appendix G: Parking Study Information



Project: 13 Mountain / 19 Elm
 Project No: 6541-20
 Location: Balsam Ln Parking
 Date: Friday December 24, 2021

Parking Demand Summary

Area	1	2	3	4	5	6	7	Total	%	Excess
Supply	22	11	27	5	22	40	35	162	Occupied	Supply
9:00	16	10	23	3	10	31	18	111	69%	51
10:00	16	10	24	2	13	26	23	114	70%	48
11:00	15	9	22	1	16	30	27	120	74%	42
12:00	15	9	22	1	19	34	31	131	81%	31
13:00	12	9	26	1	20	35	25	128	79%	34
14:00	16	6	23	1	12	29	22	109	67%	53
15:00	12	6	21	1	17	28	22	107	66%	55
16:00	11	1	13	1	10	13	16	65	40%	97
17:00	7	1	15	2	4	8	11	48	30%	114
18:00	8	0	7	2	3	3	5	28	17%	134
19:00	8	0	1	2	5	0	5	21	13%	141
Average								89	55%	98
95th Percentile								130	80%	57
Maximum								131	81%	56

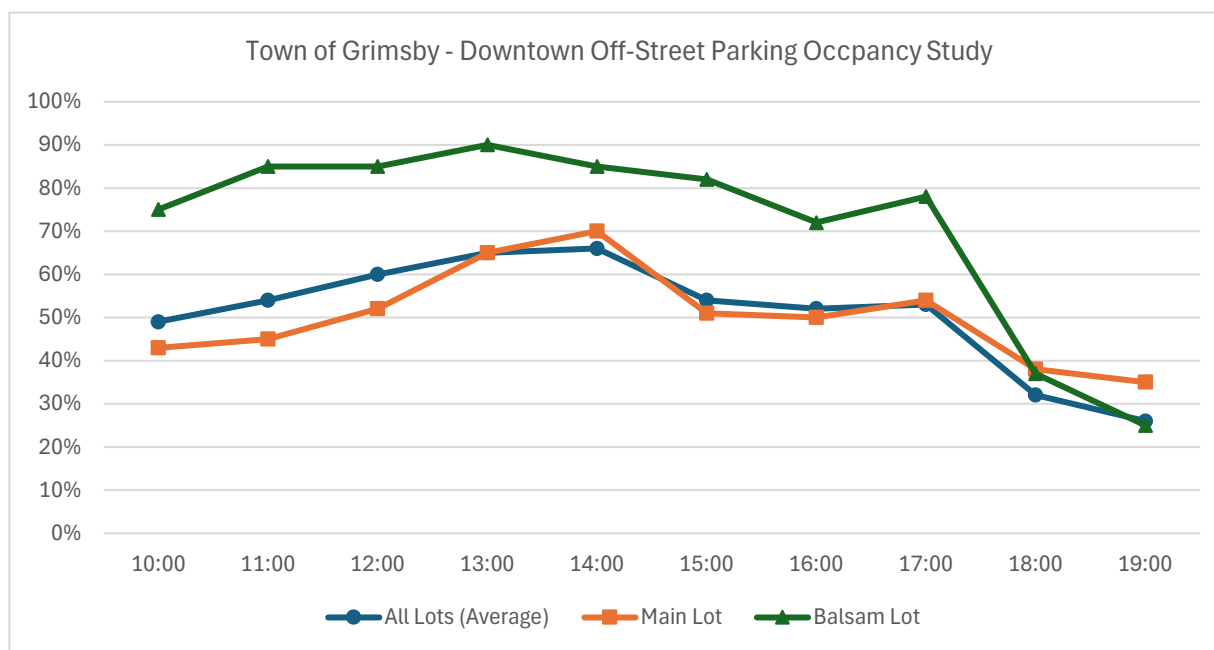


Phase 1 Report Strategic Parking Management Study - Town of Grimsby, October 2023

Appendix A - Data Collection and Results

From R.J. Burnside & Associates Limited

Time	All Lots (Average)	Main Lot	Balsam Lot
10:00	49%	43%	75%
11:00	54%	45%	85%
12:00	60%	52%	85%
13:00	65%	65%	90%
14:00	66%	70%	85%
15:00	54%	51%	82%
16:00	52%	50%	72%
17:00	53%	54%	78%
18:00	32%	38%	37%
19:00	26%	35%	25%



Phase 1 Report Strategic Parking Management Study - Town of Grimsby, October 2023

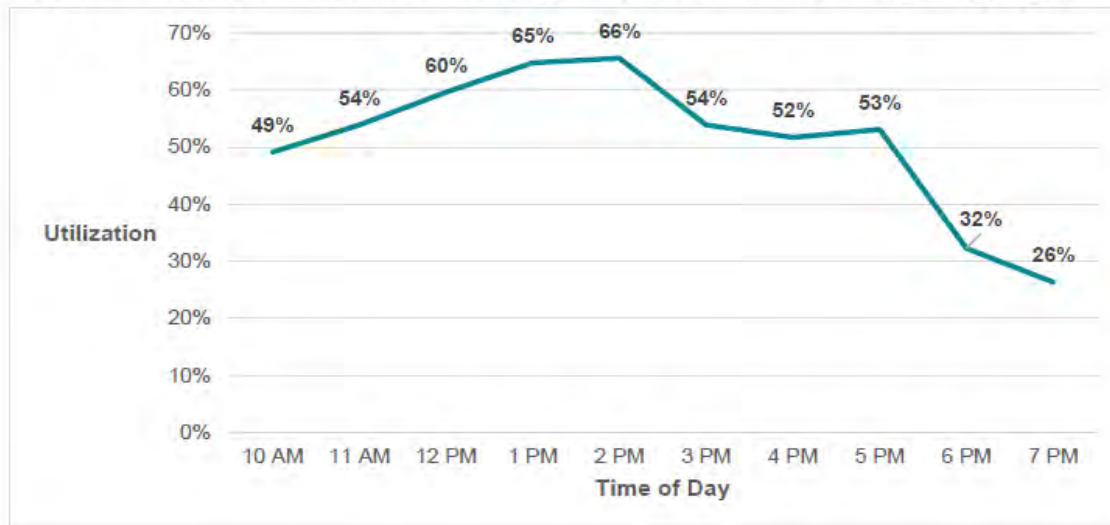
Appendix A - Data Collection and Results

From R.J. Burnside & Associates Limited

Memorandum
300055974.0000
October 26, 2023

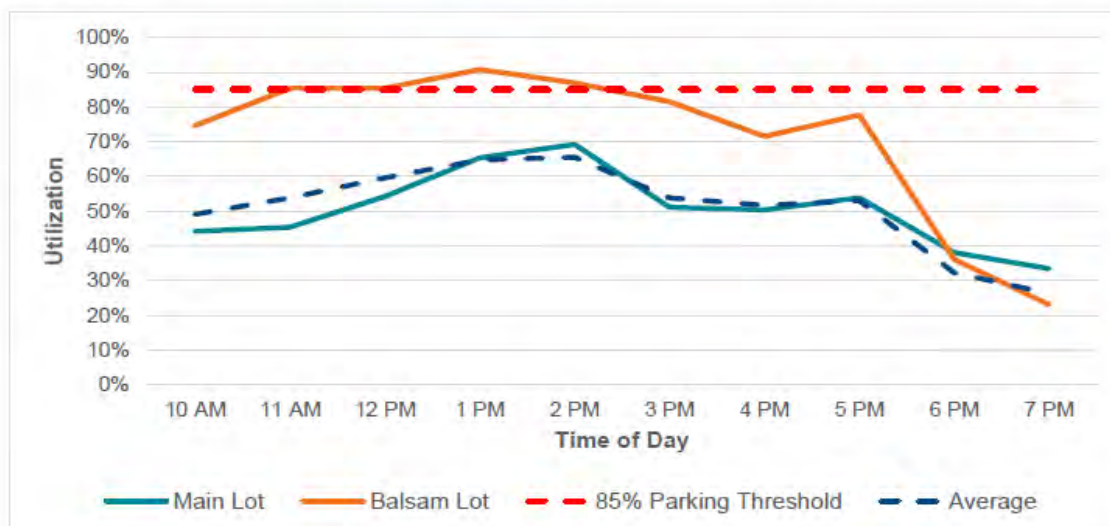
Page 8 of 44

Figure 8: Weekday utilization of off-street parking in Downtown Grimsby in aggregate



The Main Lot and Balsam Lot were the busiest lots in Downtown Grimsby. **Figure 9** shows the utilization of these lots compared to the 85% critical threshold and the average utilization of the off-street parking lots throughout the day.

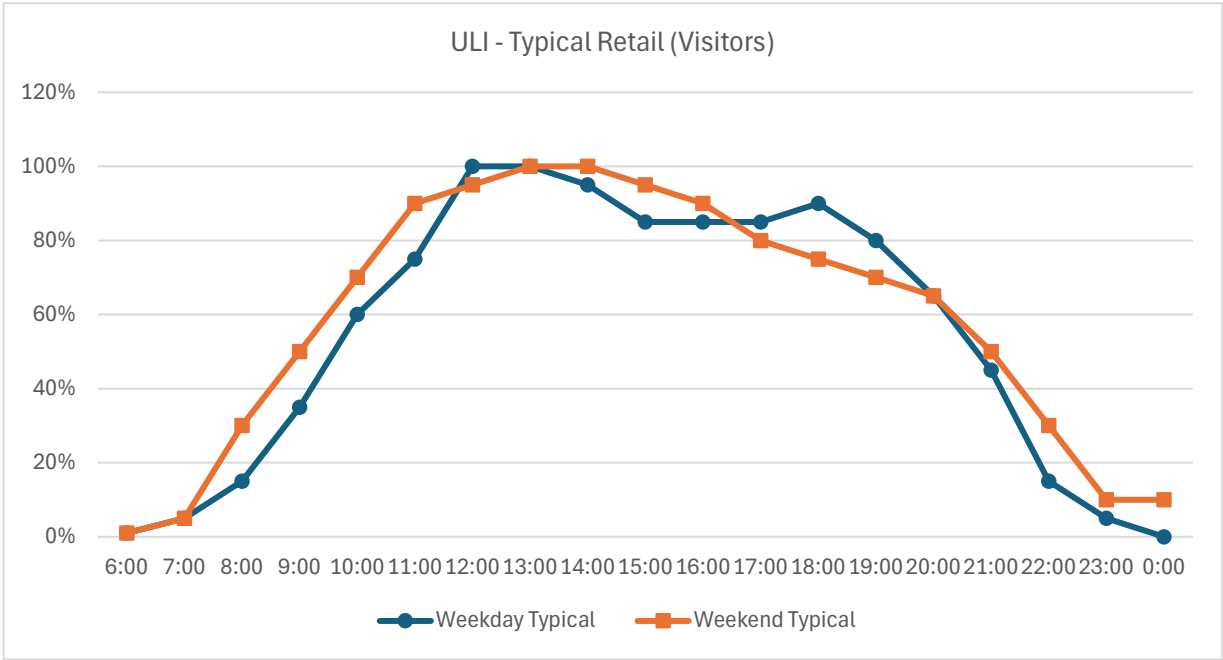
Figure 9: Weekday utilization of Balsam Lot and Main Lot compared to average and threshold



ULI Shared Parking 3rd Edition

Land Use	User
Retail typical	Visitors

Time	Weekday Typical	Weekend Typical
6:00	1%	1%
7:00	5%	5%
8:00	15%	30%
9:00	35%	50%
10:00	60%	70%
11:00	75%	90%
12:00	100%	95%
13:00	100%	100%
14:00	95%	100%
15:00	85%	95%
16:00	85%	90%
17:00	85%	80%
18:00	90%	75%
19:00	80%	70%
20:00	65%	65%
21:00	45%	50%
22:00	15%	30%
23:00	5%	10%
0:00	0%	10%



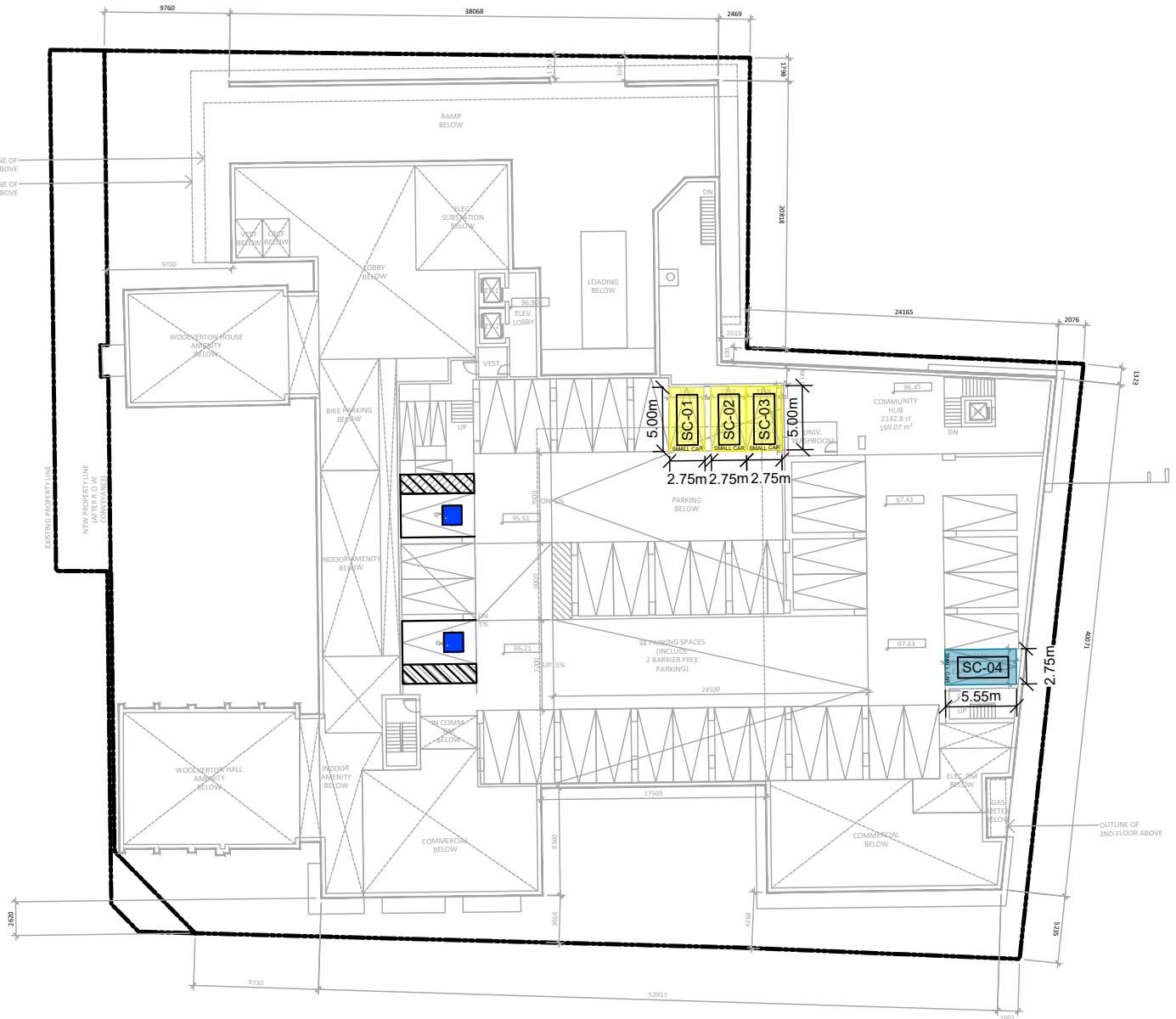
Appendix H:

Non-standard Parking Space Review





Date Plotted: May 14, 2025 Filename: J:\6541-20\BA\Small Car Review\R02 - May 14, 2025\ba-13 Mountain Street-SCR-R01-6541-20.dwg



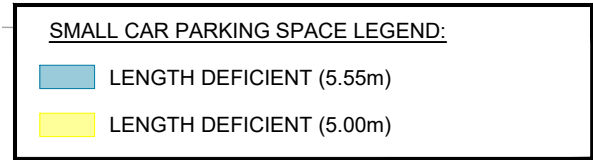
SMALL CAR PARKING SPACE LEGEND:

-  LENGTH DEFICIENT (5.55m)
-  LENGTH DEFICIENT (5.00m)



13 MOUNTAIN STREET, GRIMSBY
SMALL CAR PARKING INVENTORY
INTERMEDIATE FLOOR

Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	SC-01



Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	SC-02



Date Plotted: May 14, 2025
Filename: J:\6541-20\BA\Small Car Review\R02 - May 14, 2025\ba-13 Mountain Street-SCR-R01-6541-20.dwg



SMALL CAR PARKING SPACE LEGEND:

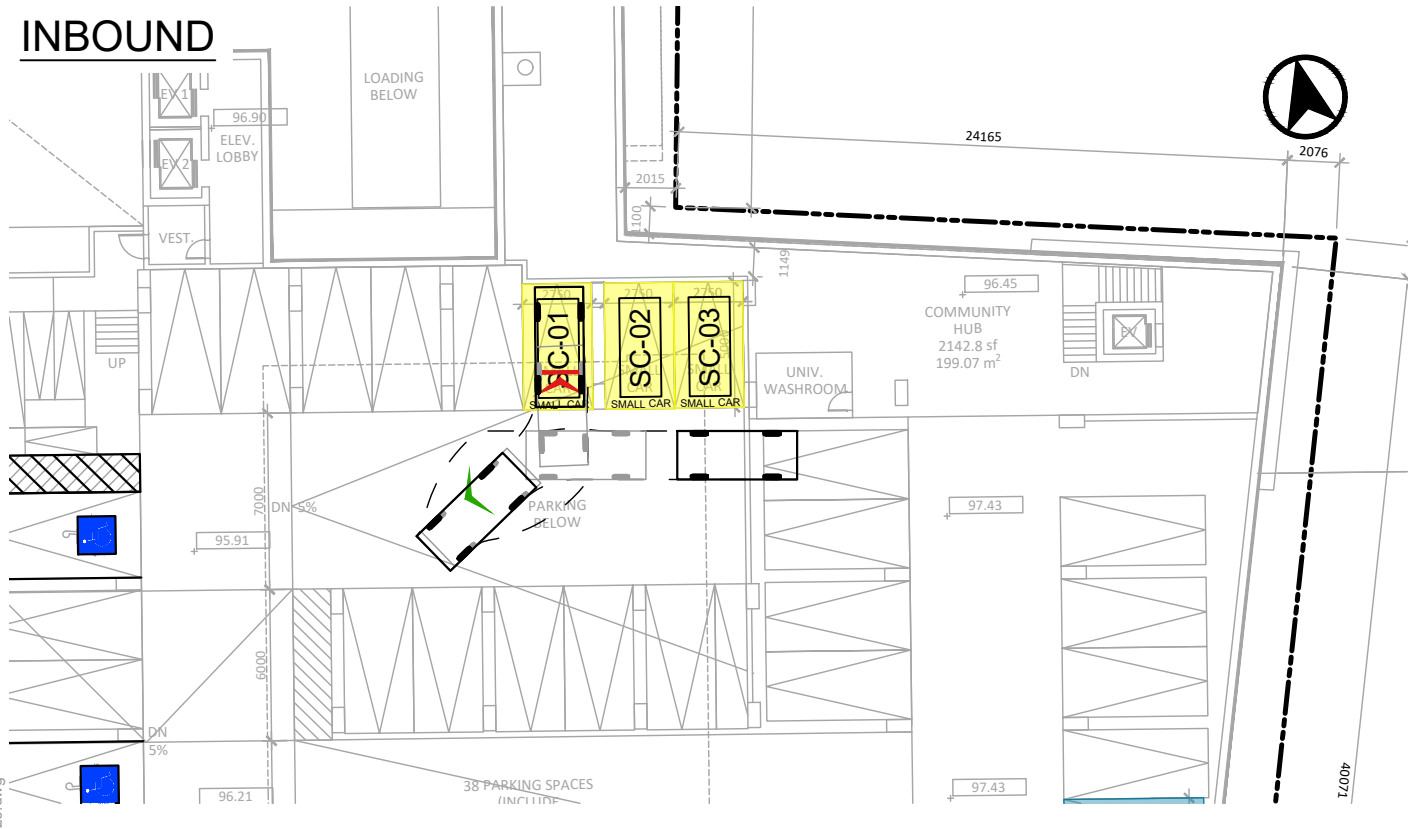
-  LENGTH DEFICIENT (5.55m)
-  LENGTH DEFICIENT (5.00m)



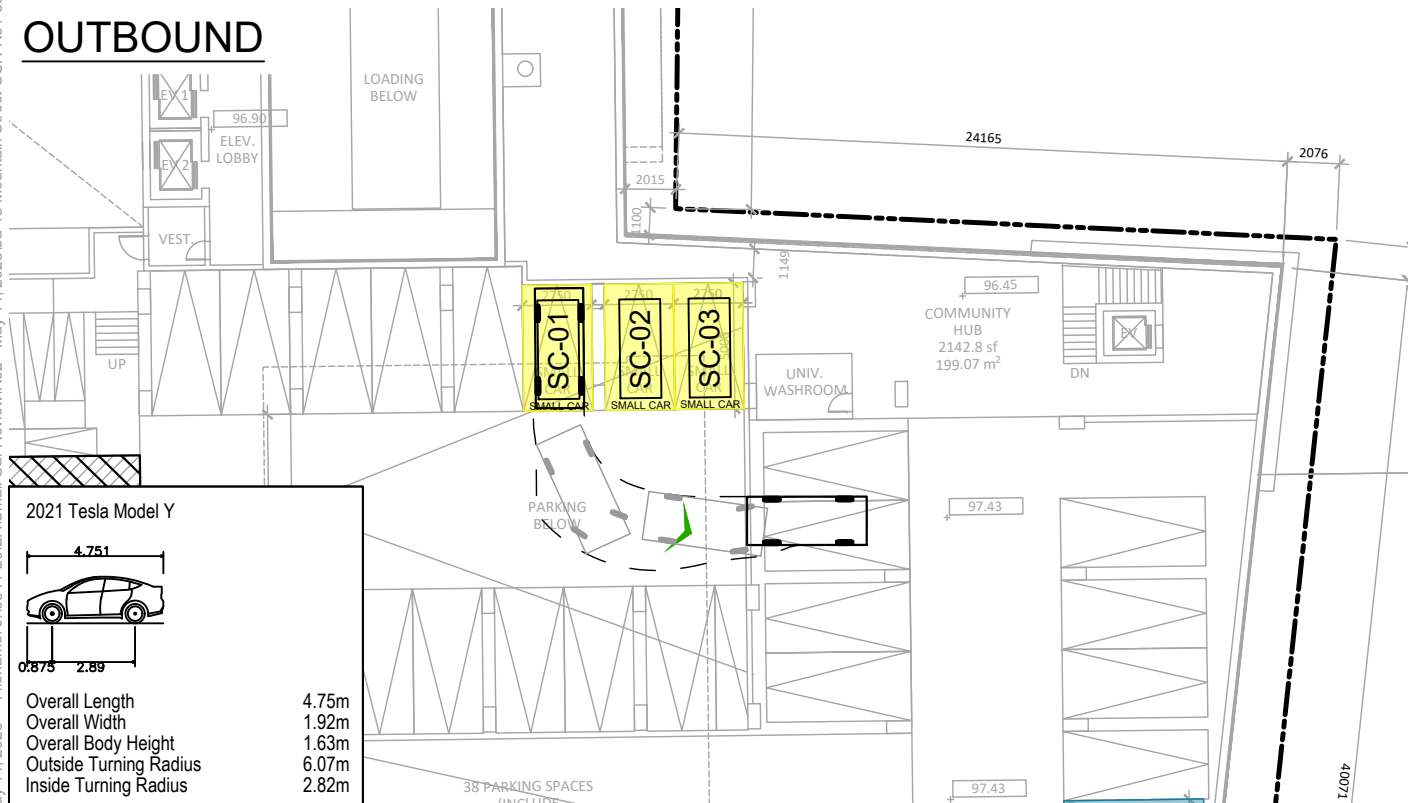
13 MOUNTAIN STREET, GRIMSBY
SMALL CAR PARKING INVENTORY
P1 FLOOR

Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	SC-03

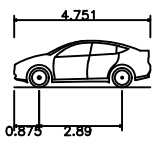
INBOUND



OUTBOUND



2021 Tesla Model Y



Overall Length 4.75m
Overall Width 1.92m
Overall Body Height 1.63m
Outside Turning Radius 6.07m
Inside Turning Radius 2.82m

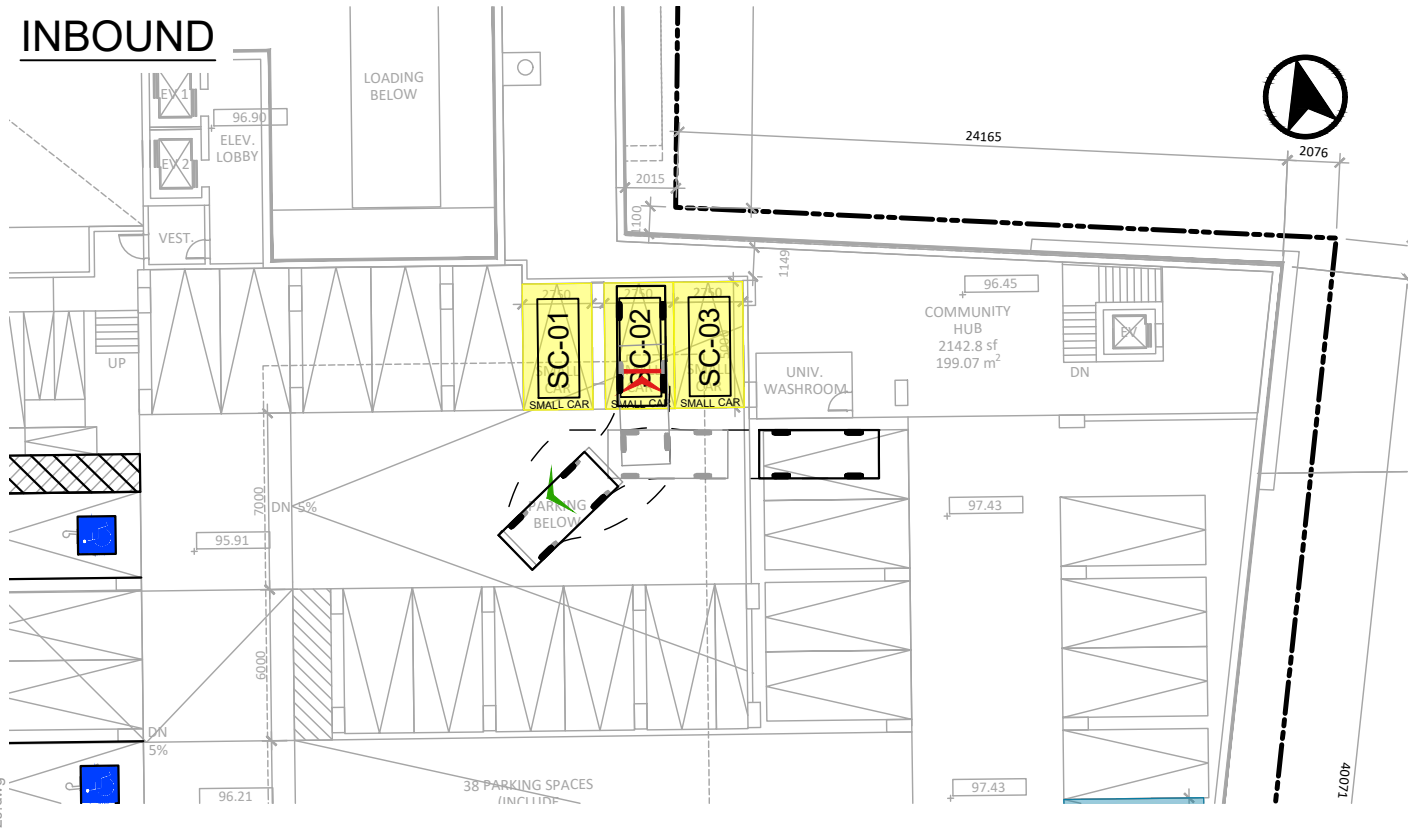
0 5 10m
1:300 Scale



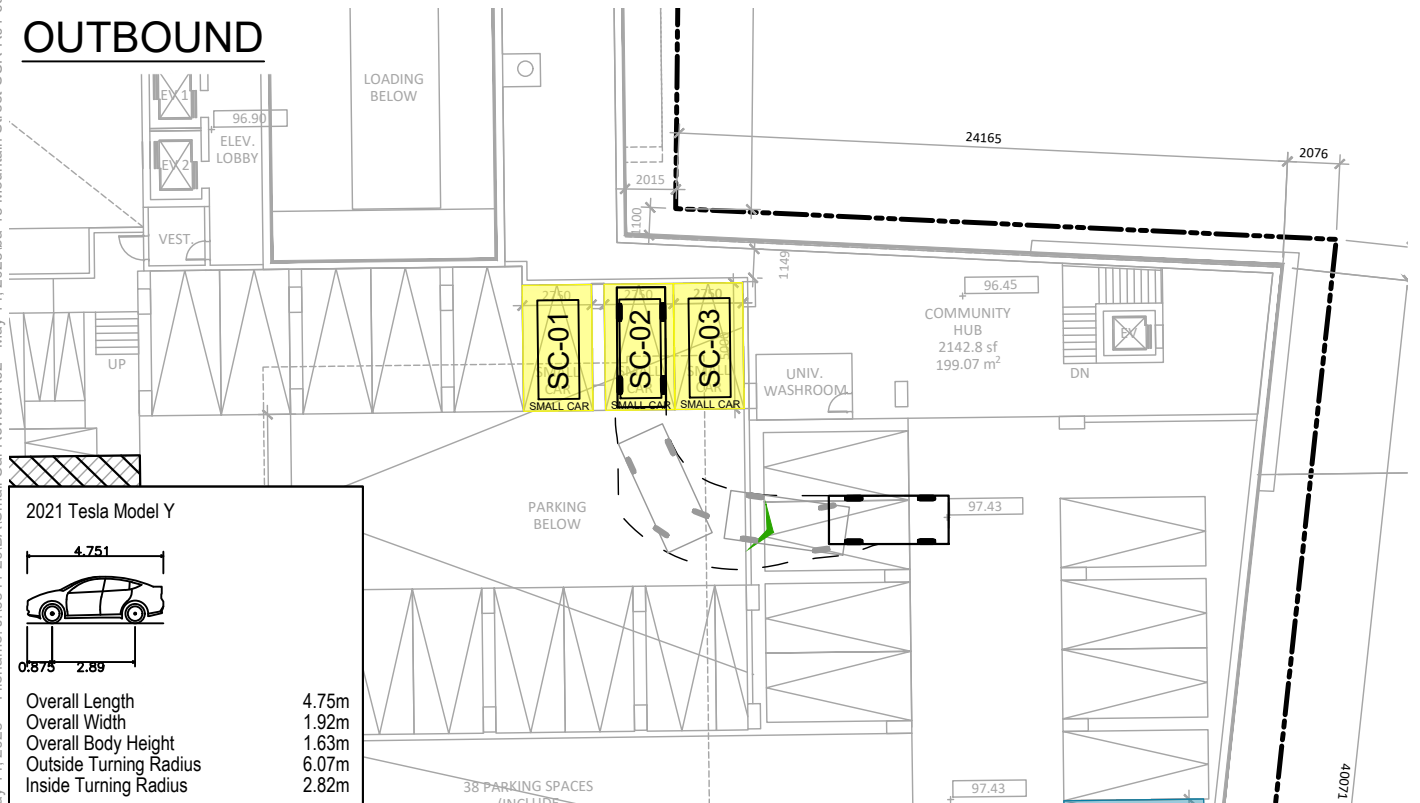
13 MOUNTAIN STREET, GRIMSBY VEHICULAR MANOEUVRING DIAGRAM SPACE SC-01 REVERSE IN & FORWARD OUT

Project: 13 MOUNTAIN STREET
Project No. 6541-20
Date: MAY 16, 2025
Revised: --
Drawing No. VMD-01

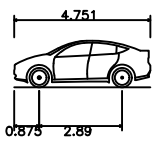
INBOUND



OUTBOUND



2021 Tesla Model Y



Overall Length	4.75m
Overall Width	1.92m
Overall Body Height	1.63m
Outside Turning Radius	6.07m
Inside Turning Radius	2.82m

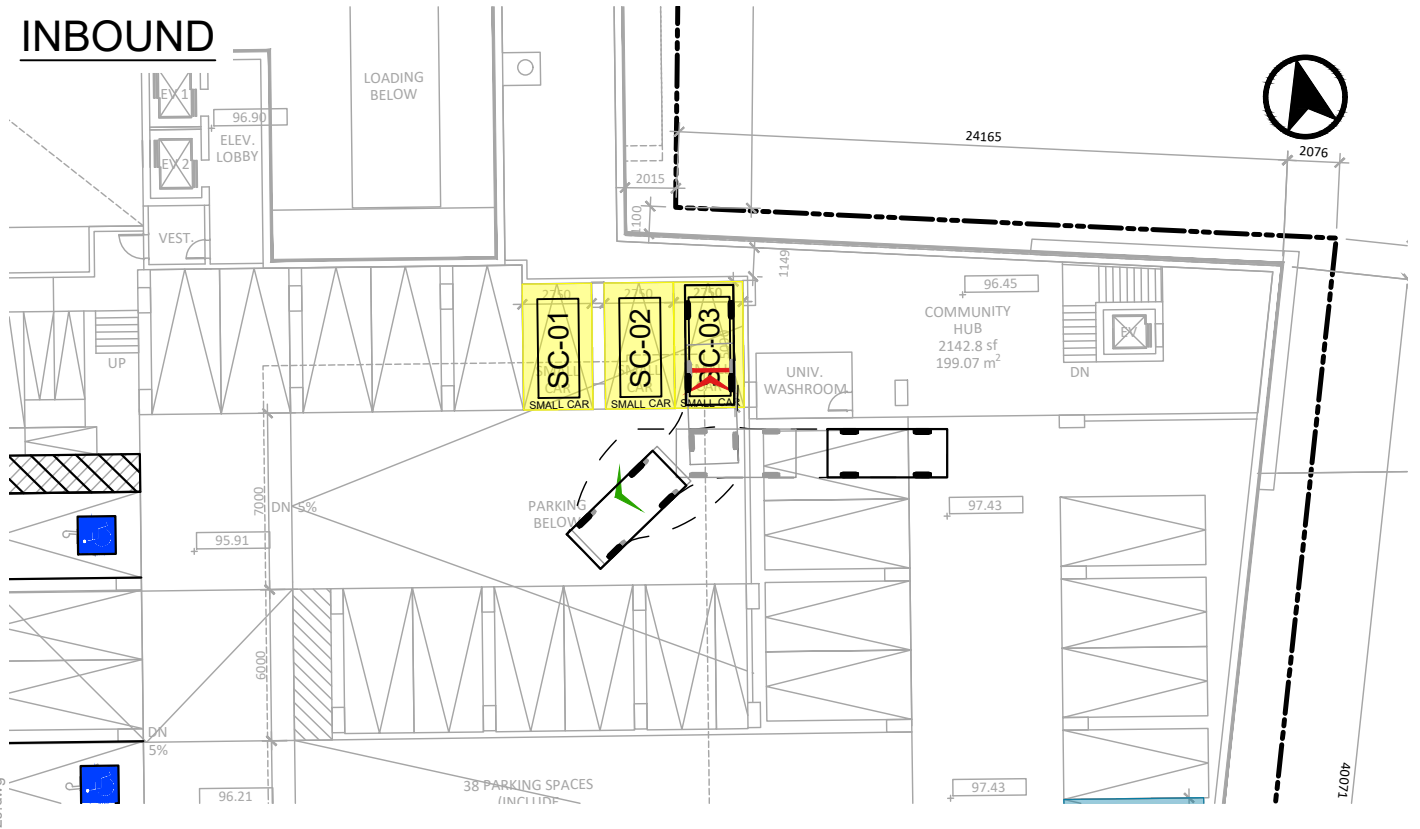
0 5 10m
1:300 Scale



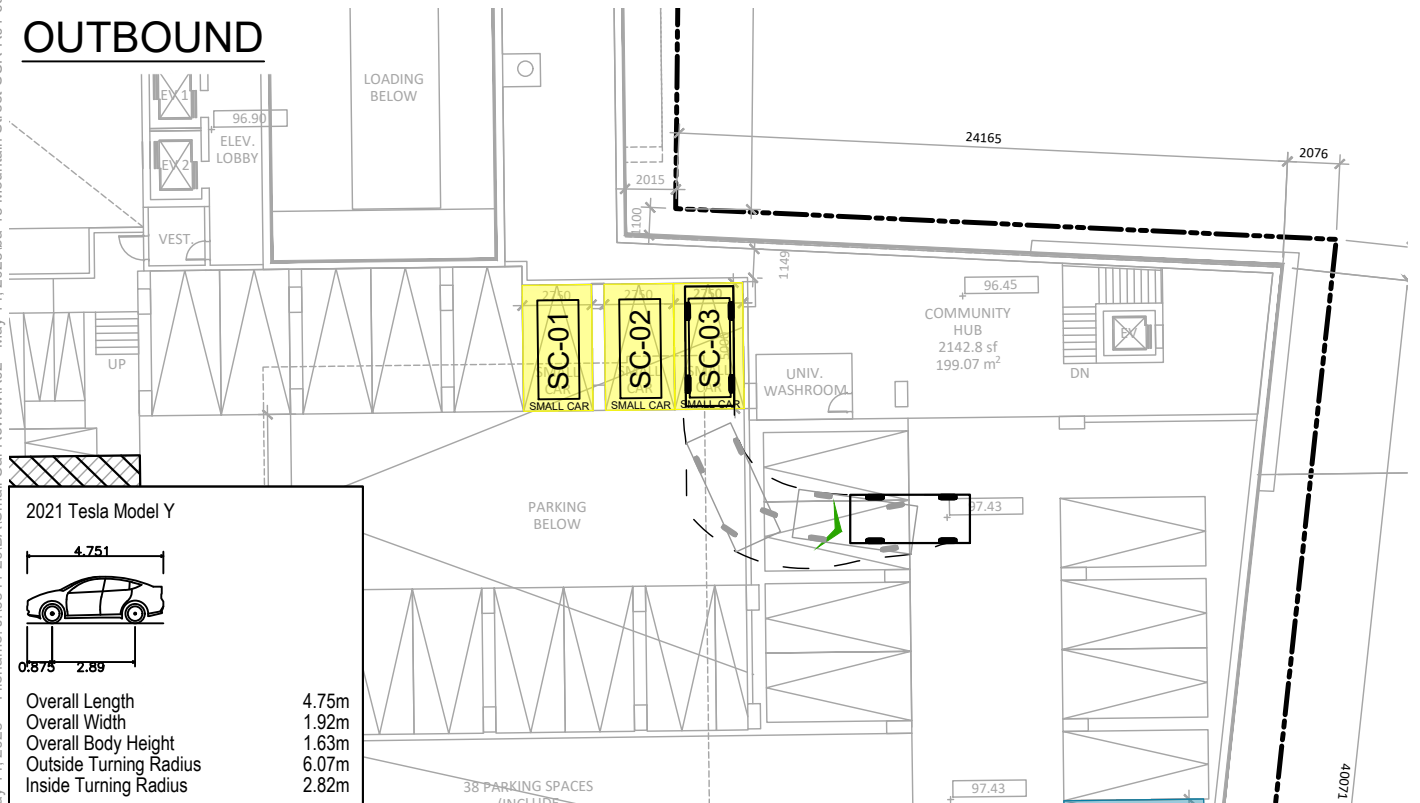
13 MOUNTAIN STREET, GRIMSBY VEHICULAR MANOEUVRING DIAGRAM SPACE SC-02 REVERSE IN & FORWARD OUT

Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	VMD-02

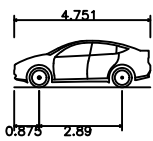
INBOUND



OUTBOUND



2021 Tesla Model Y



Overall Length 4.75m
Overall Width 1.92m
Overall Body Height 1.63m
Outside Turning Radius 6.07m
Inside Turning Radius 2.82m

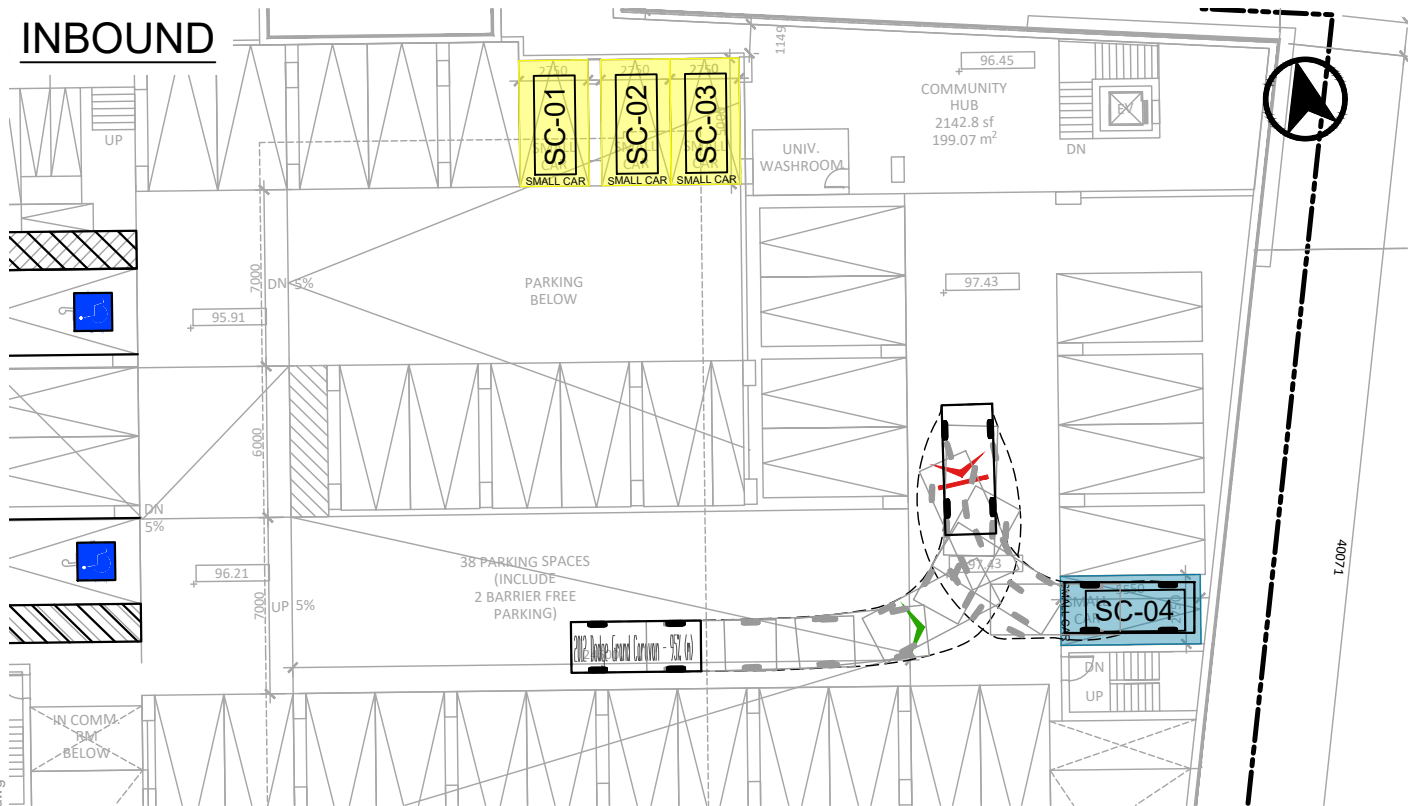
0 5 10m
1:300 Scale



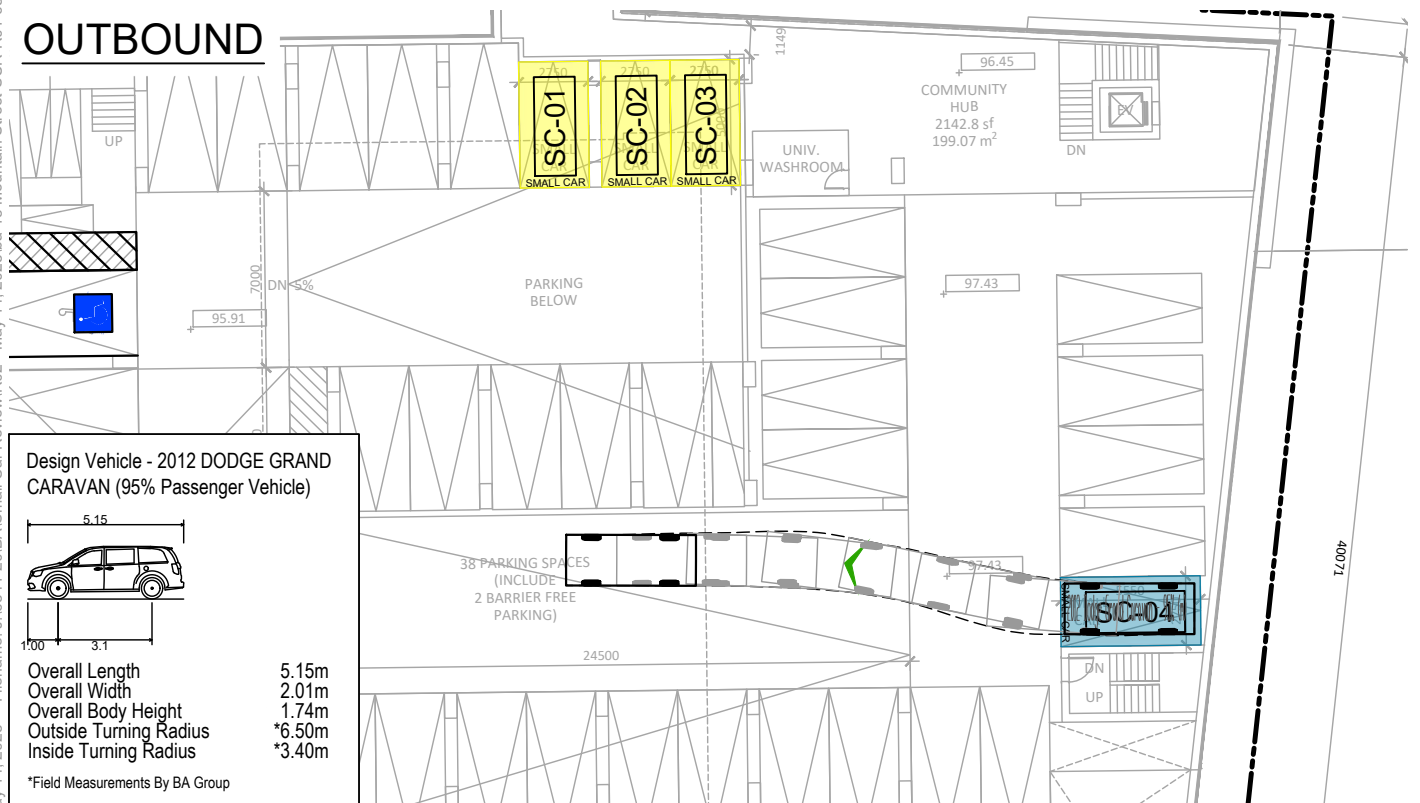
13 MOUNTAIN STREET, GRIMSBY VEHICULAR MANOEUVRING DIAGRAM SPACE SC-03 REVERSE IN & FORWARD OUT

Project: 13 MOUNTAIN STREET
Project No. 6541-20
Date: MAY 16, 2025
Revised: --
Drawing No. VMD-03

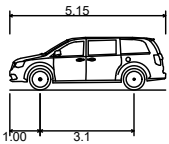
INBOUND



OUTBOUND



Design Vehicle - 2012 DODGE GRAND
CARAVAN (95% Passenger Vehicle)



Overall Length 5.15m
Overall Width 2.01m
Overall Body Height 1.74m
Outside Turning Radius 6.50m
Inside Turning Radius 3.40m

*Field Measurements By BA Group

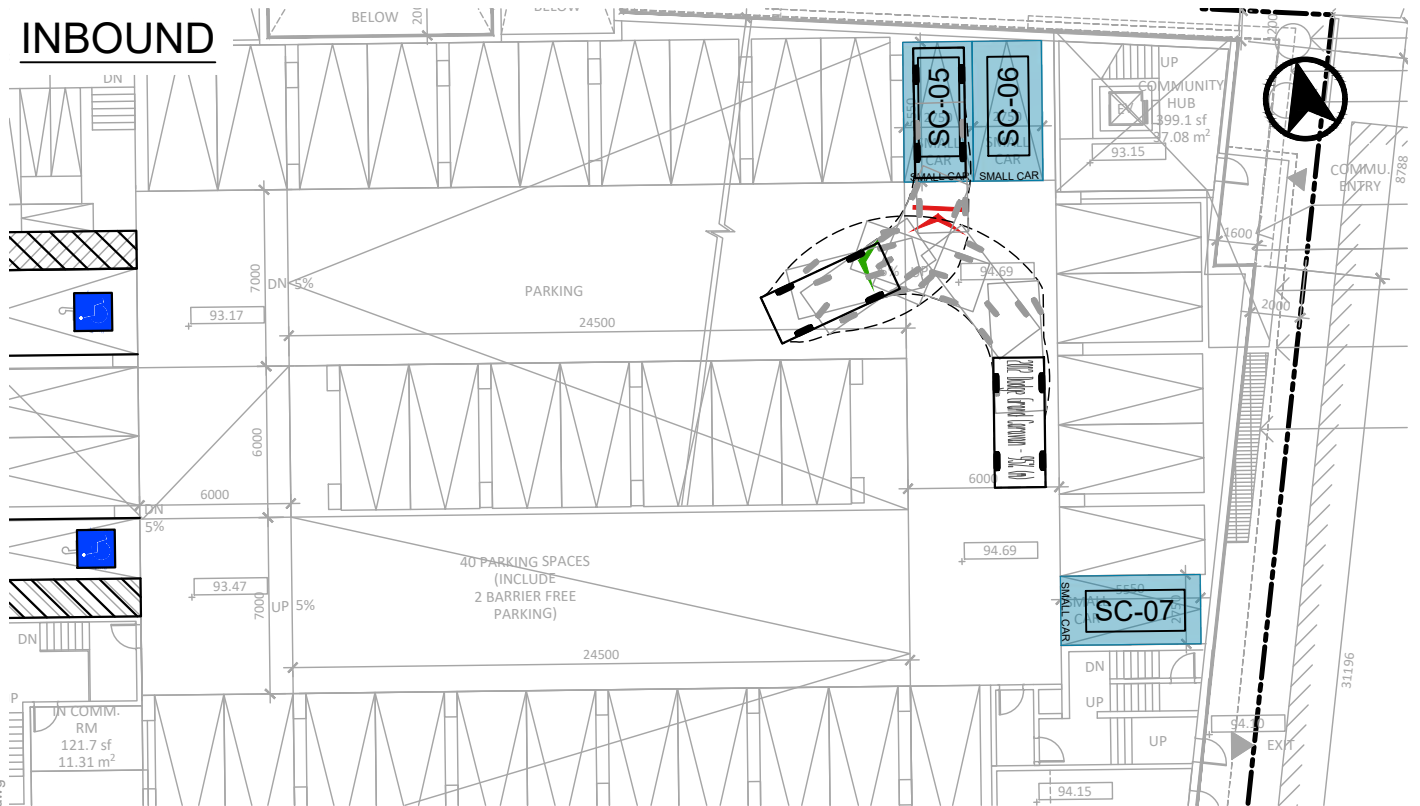
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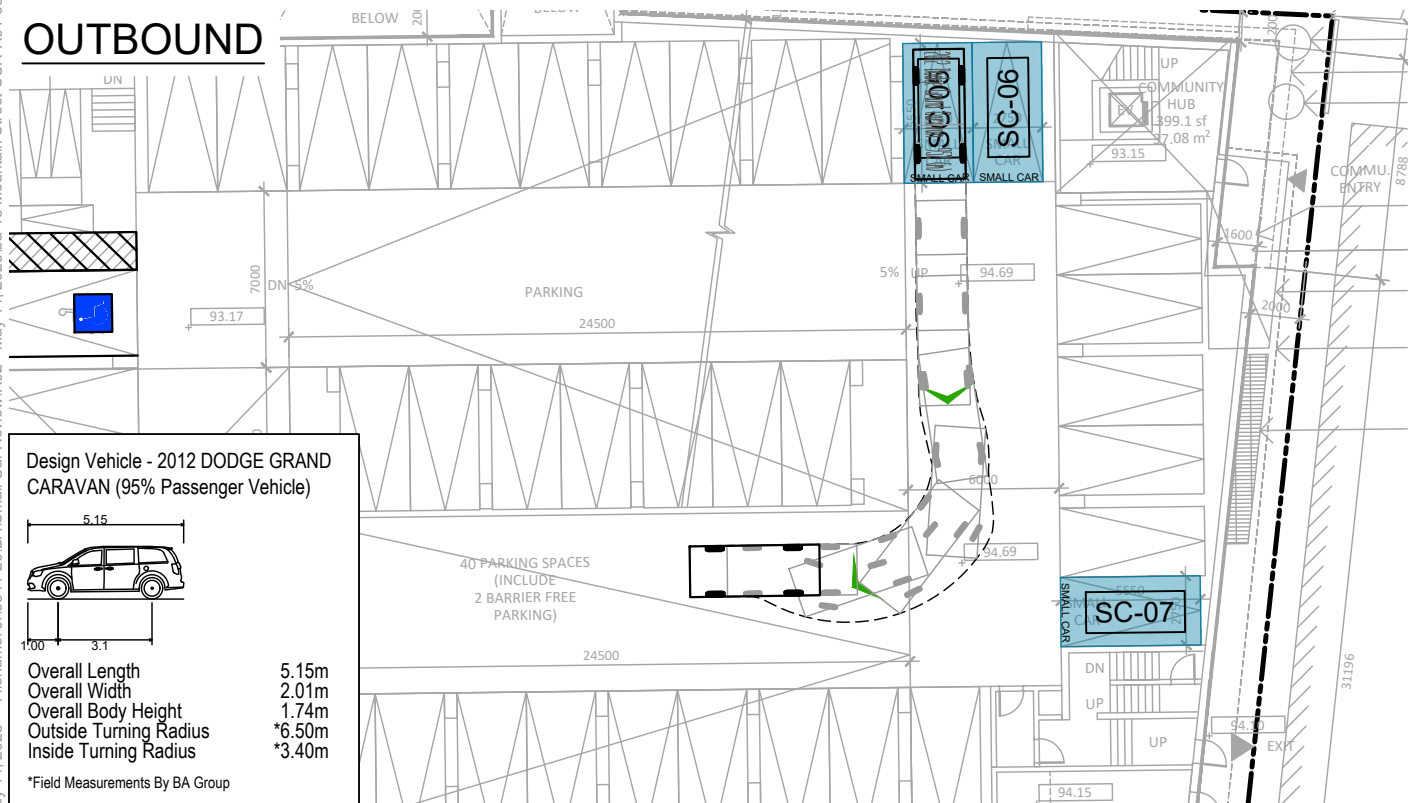
13 MOUNTAIN STREET, GRIMSBY
VEHICULAR MANOEUVRING DIAGRAM
SPACE SC-04 REVERSE IN & FORWARD OUT

Project: 13 MOUNTAIN STREET
Project No. 6541-20
Date: MAY 16, 2025
Revised: --
Drawing No. VMD-04

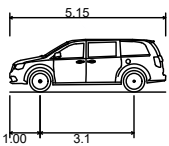
INBOUND



OUTBOUND



Design Vehicle - 2012 DODGE GRAND CARAVAN (95% Passenger Vehicle)



Overall Length 5.15m
Overall Width 2.01m
Overall Body Height 1.74m
Outside Turning Radius 6.50m
Inside Turning Radius 3.40m

*Field Measurements By BA Group

0 5 10m
1:300 Scale



13 MOUNTAIN STREET, GRIMSBY VEHICULAR MANOEUVRING DIAGRAM SPACE SC-05 REVERSE IN & FORWARD OUT

Project: 13 MOUNTAIN STREET
Project No. 6541-20
Date: MAY 16, 2025
Revised: --
Drawing No. VMD-05

[illegible]

OUTBOUND

The site plan illustrates the layout of a vehicle storage area. A central parking lot, labeled 'PARKING' with dimensions 24500 by 7000, is flanked by building footprints. To the left, a building has a 'DN' (down) ramp and a blue square feature. To the right, a building has a 'COMMUNITY HUB' (399.1 sf / 37.08 m²) and a 'COMM. ENTRY'. A curved path, indicated by a dashed line and green arrows, leads from the parking area towards the right. Along this path, three vehicle storage units are labeled: 'SC-05' and 'SC-06' (top right) and 'SC-07' (bottom right). These units are marked as 'SMALL CAR' and 'SMALL CAR' respectively. A '40 PARKING SPACES (INCLUDE 2 BARRIER FREE PARKING)' area is shown at the bottom left. A vehicle icon is shown in the bottom left corner, with dimensions: Overall Length 5.15m, Overall Width 2.01m, Overall Body Height 1.74m, Outside Turning Radius *6.50m, and Inside Turning Radius *3.40m. The plan also shows various ramps (DN, UP), stairs, and a 'COMM. ENTRY' on the far right. Dimensions like 93.17, 93.15, 94.69, 94.50, 94.15, 1600, 2000, 31196, and 8788 are marked throughout the plan.

Design Vehicle - 2012 DODGE GRAND CARAVAN (95% Passenger Vehicle)

5.15

2.01

1.74

*6.50m

*3.40m

Overall Length
Overall Width
Overall Body Height
Outside Turning Radius
Inside Turning Radius

*Field Measurements By BA Group

Diagram illustrating the dimensions of a car:

- Total length: 5.15
- Wheelbase (distance between front and rear axles): 3.1
- Front overhang (distance from front bumper to front axle): 1.00

Overall Length	5.15m
Overall Width	2.01m
Overall Body Height	1.74m
Outside Turning Radius	*6.50m
Inside Turning Radius	*3.40m

*Field Measurements By BA Group



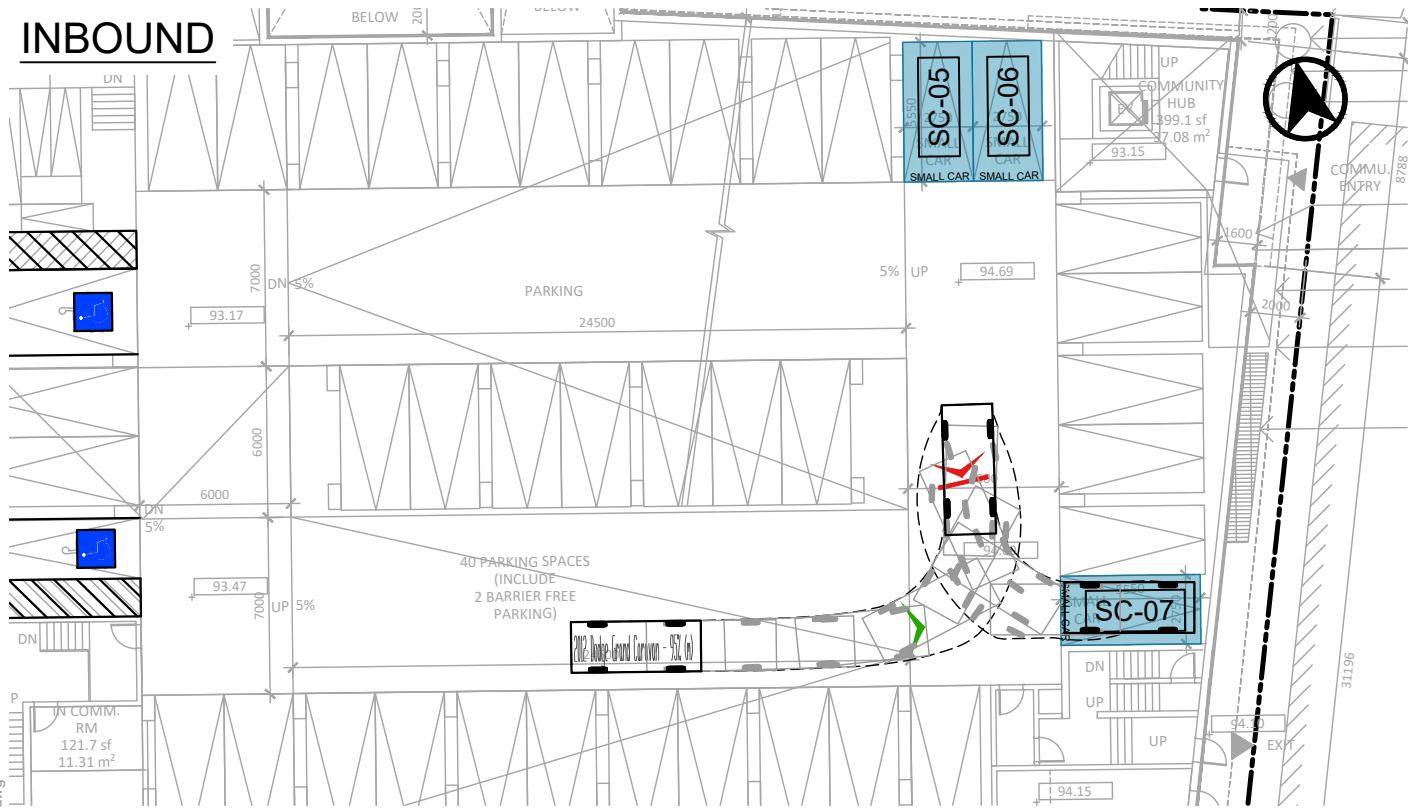
BA Group

13 MOUNTAIN STREET, GRIMSBY
VEHICULAR MANOEUVRING DIAGRAM
SPACE SC-06 REVERSE IN & FORWARD OUT

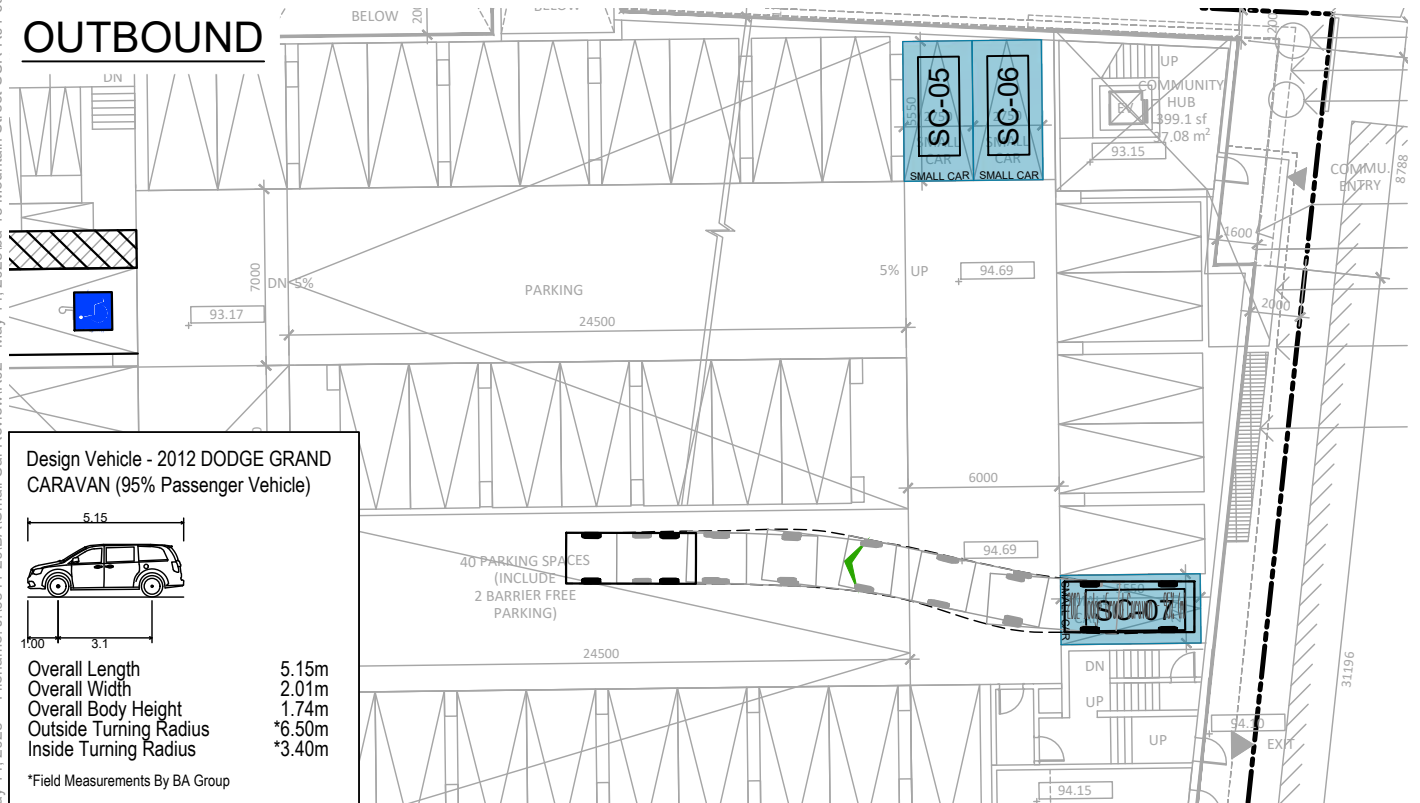
Project: 13 MOUNTAIN STREET
Project No. 6541-20
Date: MAY 16, 2025
Revised: --

Drawing No. **VMD-06**

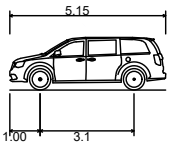
INBOUND



OUTBOUND



Design Vehicle - 2012 DODGE GRAND CARAVAN (95% Passenger Vehicle)



Overall Length 5.15m
Overall Width 2.01m
Overall Body Height 1.74m
Outside Turning Radius 6.50m
Inside Turning Radius 3.40m

*Field Measurements By BA Group

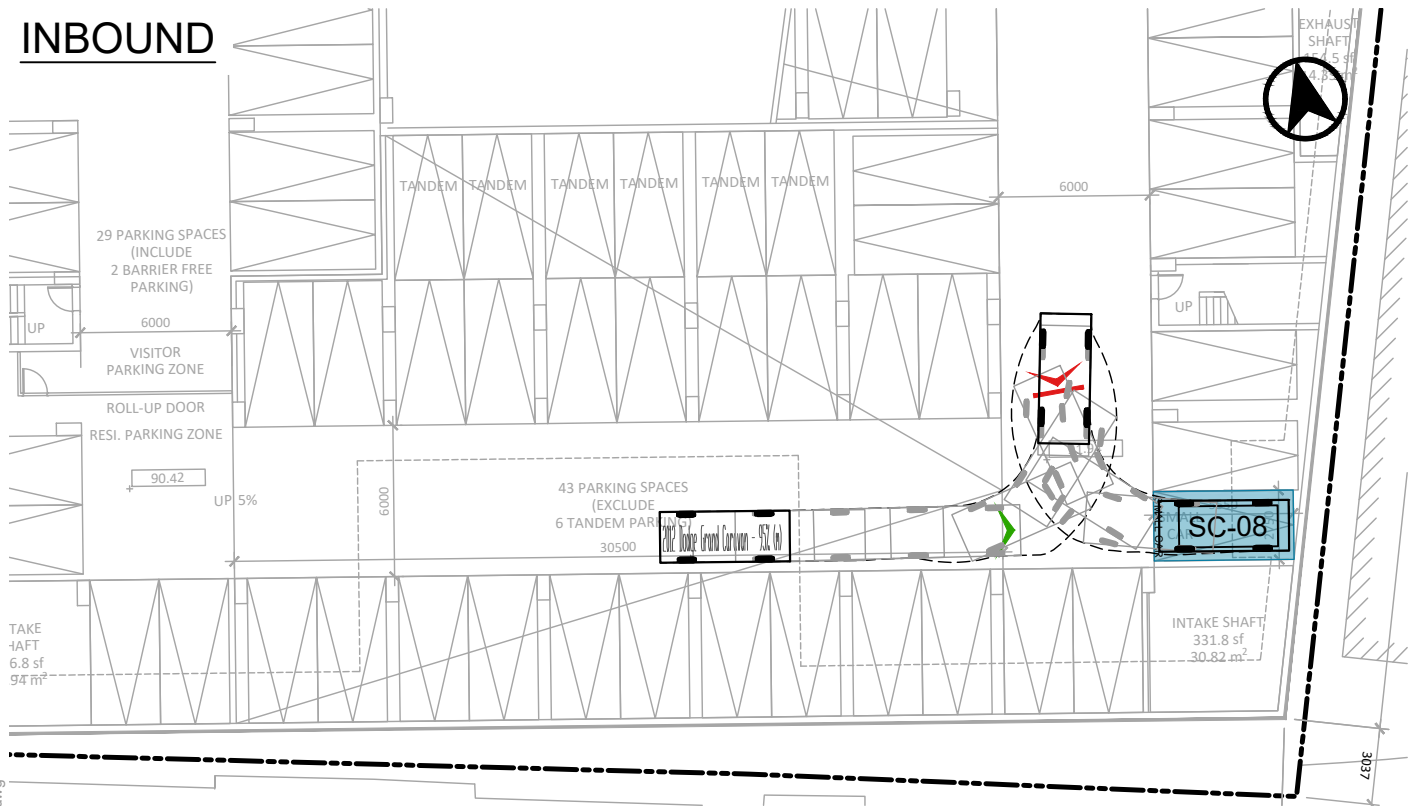
0 5 10m
1:300 Scale



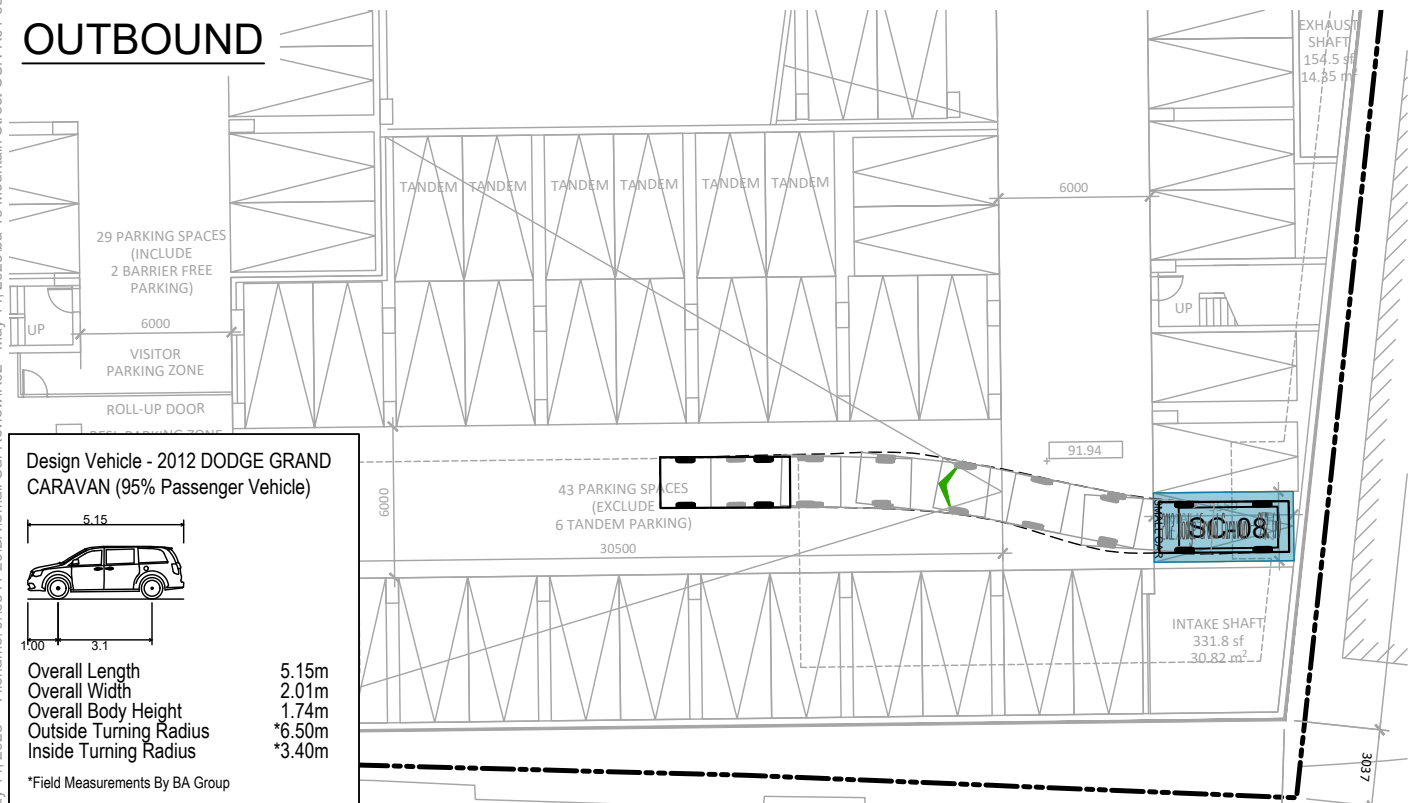
13 MOUNTAIN STREET, GRIMSBY VEHICULAR MANOEUVRING DIAGRAM SPACE SC-07 REVERSE IN & FORWARD OUT

Project: 13 MOUNTAIN STREET
Project No. 6541-20
Date: MAY 16, 2025
Revised: --
Drawing No. VMD-07

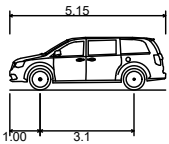
INBOUND



OUTBOUND



Design Vehicle - 2012 DODGE GRAND CARAVAN (95% Passenger Vehicle)



Overall Length 5.15m
Overall Width 2.01m
Overall Body Height 1.74m
Outside Turning Radius *6.50m
Inside Turning Radius *3.40m

*Field Measurements By BA Group

0 5 10m
1:300 Scale



13 MOUNTAIN STREET, GRIMSBY
VEHICULAR MANOEUVRING DIAGRAM
SPACE SC-08 REVERSE IN & FORWARD OUT

Project: 13 MOUNTAIN STREET
Project No. 6541-20
Date: MAY 16, 2025
Revised: --
Drawing No. VMD-08

Automotive Top 100 Sales from 2013-2022

Summary of All Vehicles Excluding Trucks and Cargo Vans



Year	Percentile	Length (cm)	Width (cm)	Height (cm)	Wheelbase (cm)
2013	Minimum	355	163	137	230
	Average	463	184	159	273
	85%	489	193	172	287
	90%	505	196	176	292
	95%	513	200	180	302
	Maximum	517	201	185	308
2014	Minimum	355	163	137	230
	Average	465	184	160	274
	85%	489	193	173	287
	90%	501	196	176	292
	95%	513	200	181	302
	Maximum	517	201	185	308
2015	Minimum	378	167	137	242
	Average	464	184	160	274
	85%	490	193	174	289
	90%	501	196	177	294
	95%	511	200	181	303
	Maximum	517	201	185	308
2016	Minimum	383	167	138	242
	Average	465	185	160	274
	85%	492	193	174	289
	90%	504	196	176	299
	95%	511	200	180	303
	Maximum	523	203	196	308
2017	Minimum	372	163	137	238
	Average	466	185	159	275
	85%	492	193	174	290
	90%	500	196	174	293
	95%	505	199	177	300
	Maximum	517	203	188	306
2018	Minimum	372	163	138	238
	Average	466	185	161	275
	85%	499	194	174	290
	90%	504	197	176	298
	95%	511	199	178	304
	Maximum	519	203	188	310
2019	Minimum	364	160	137	239
	Average	468	186	163	276
	85%	504	196	176	292
	90%	508	198	180	298
	95%	518	200	182	307
	Maximum	536	204	194	322
2020	Minimum	364	160	123	239
	Average	472	188	161	280
	85%	502	199	178	300
	90%	508	200	179	303
	95%	522	203	192	307
	Maximum	577	206	194	341
2021	Minimum	364	160	123	239
	Average	472	188	162	280
	85%	504	199	178	300
	90%	508	201	180	304
	95%	522	203	192	307
	Maximum	577	206	197	341
2022	Minimum	364	160	137	239
	Average	471	188	166	279
	85%	501	199	178	298
	90%	508	200	181	304
	95%	520	202	192	307
	Maximum	572	206	200	341

Vehicle Type	% of Vehicle Type
CAR	52%
SUV	43%
VAN	5%
CAR	48%
SUV	47%
VAN	5%
CAR	48%
SUV	48%
VAN	4%
CAR	44%
SUV	52%
VAN	4%
CAR	49%
SUV	48%
VAN	3%
CAR	41%
SUV	54%
VAN	5%
CAR	35%
SUV	60%
VAN	5%
CAR	38%
SUV	58%
VAN	4%
CAR	37%
SUV	58%
VAN	5%
CAR	20%
SUV	77%
VAN	3%

Year	Percentile	Length (cm)	Width (cm)	Height (cm)	Wheelbase (cm)
2013-2022	Minimum	355	160	123	230
	Average	467	186	161	276
	85%	499	196	175	292
	90%	505	199	178	300
	95%	514	200	182	305
	Maximum	577	206	200	341

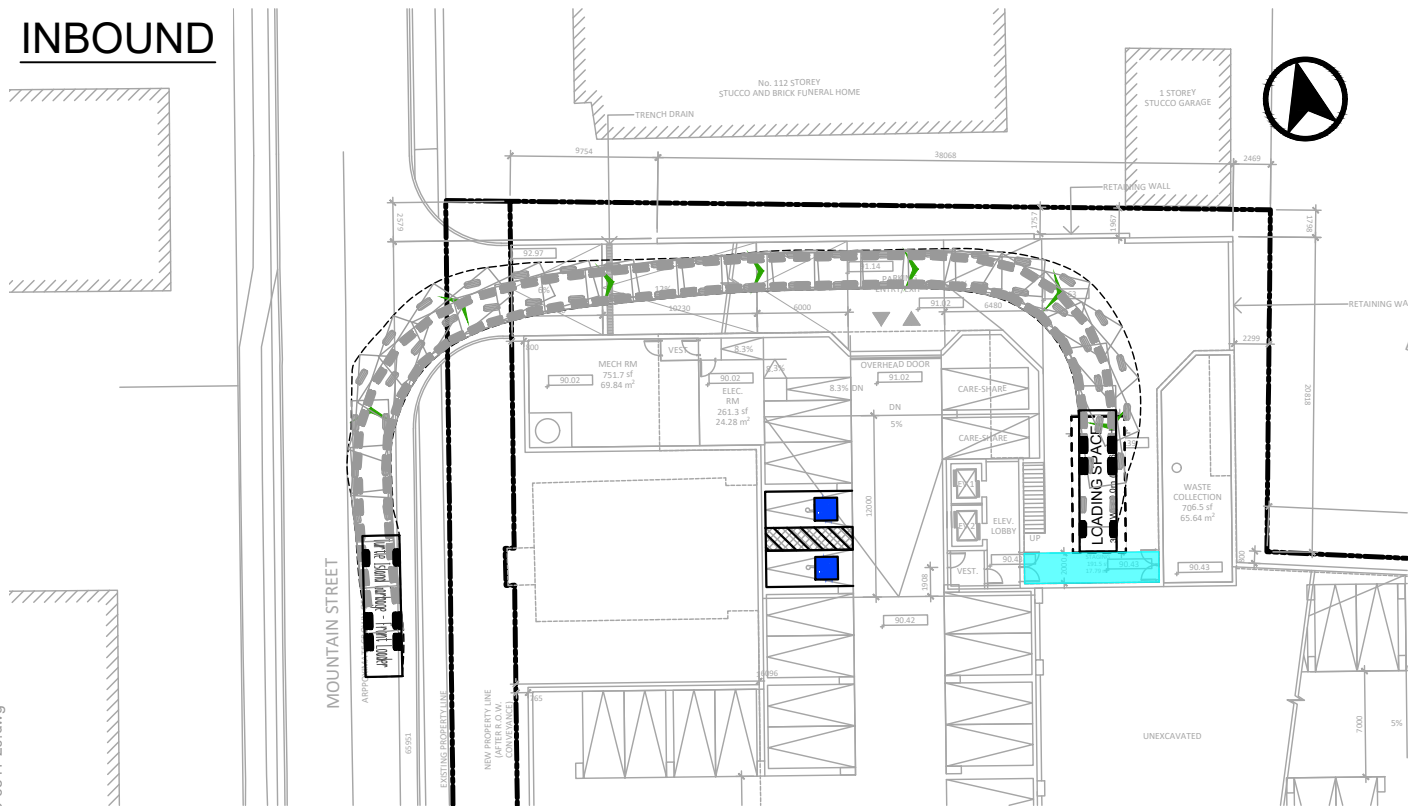
Vehicle Type	% of Vehicle Type
CAR	41%
SUV	55%
VAN	4%

Percentile Finder				
Length Percentile				
Input Percentile:	60%	Length =	476	cm
Width Percentile				
Input Percentile:	60%	Width =	186	cm
Height Percentile				
Input Percentile:	60%	Height =	168	cm
Wheelbase Percentile				
Input Percentile:	60%	Wheelbase =	279	cm

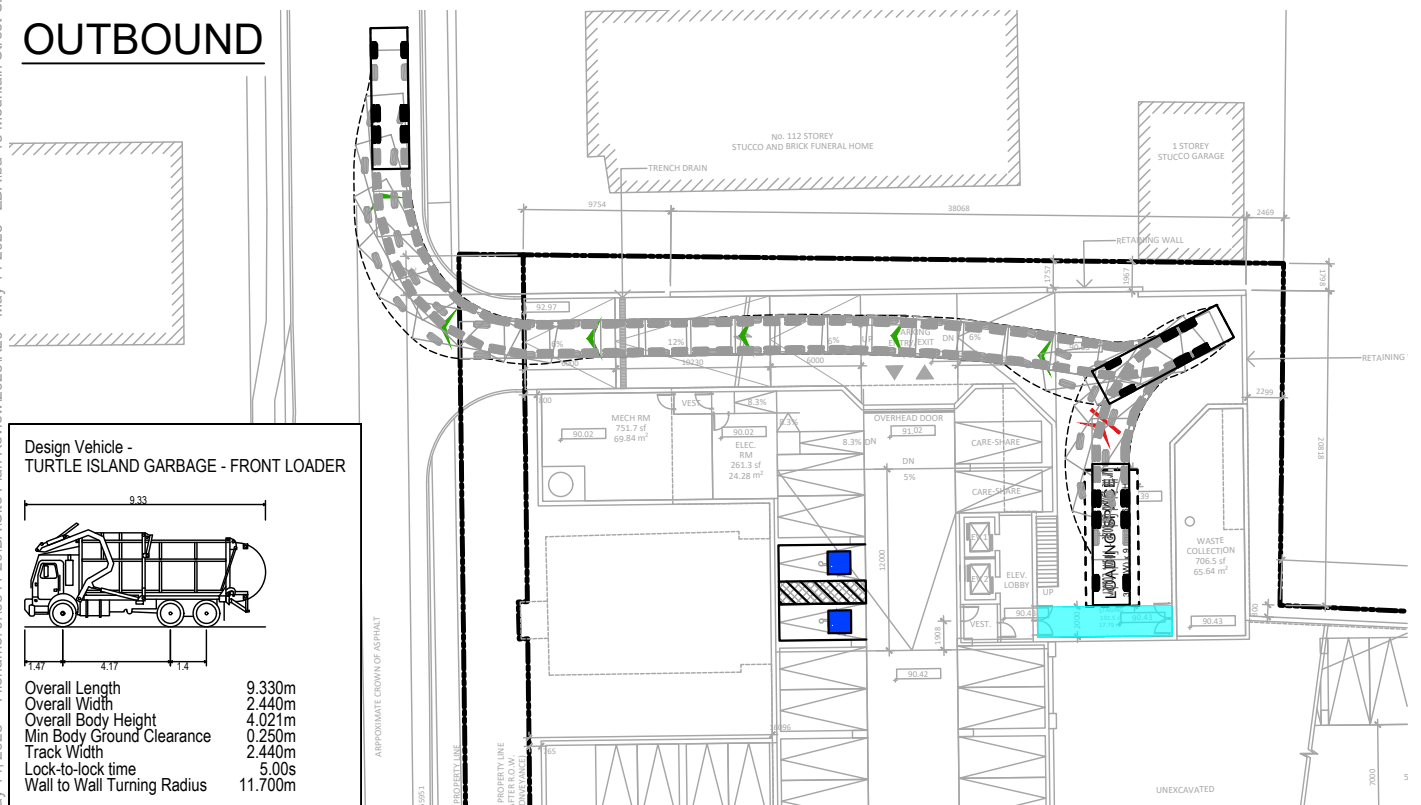
Appendix I: Vehicle Manoeuvring Diagrams



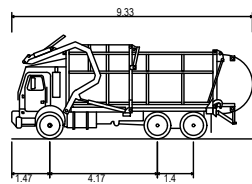
INBOUND



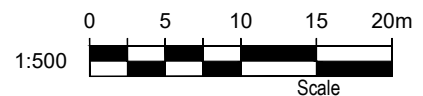
OUTBOUND



Design Vehicle - TURTLE ISLAND GARBAGE - FRONT LOADER



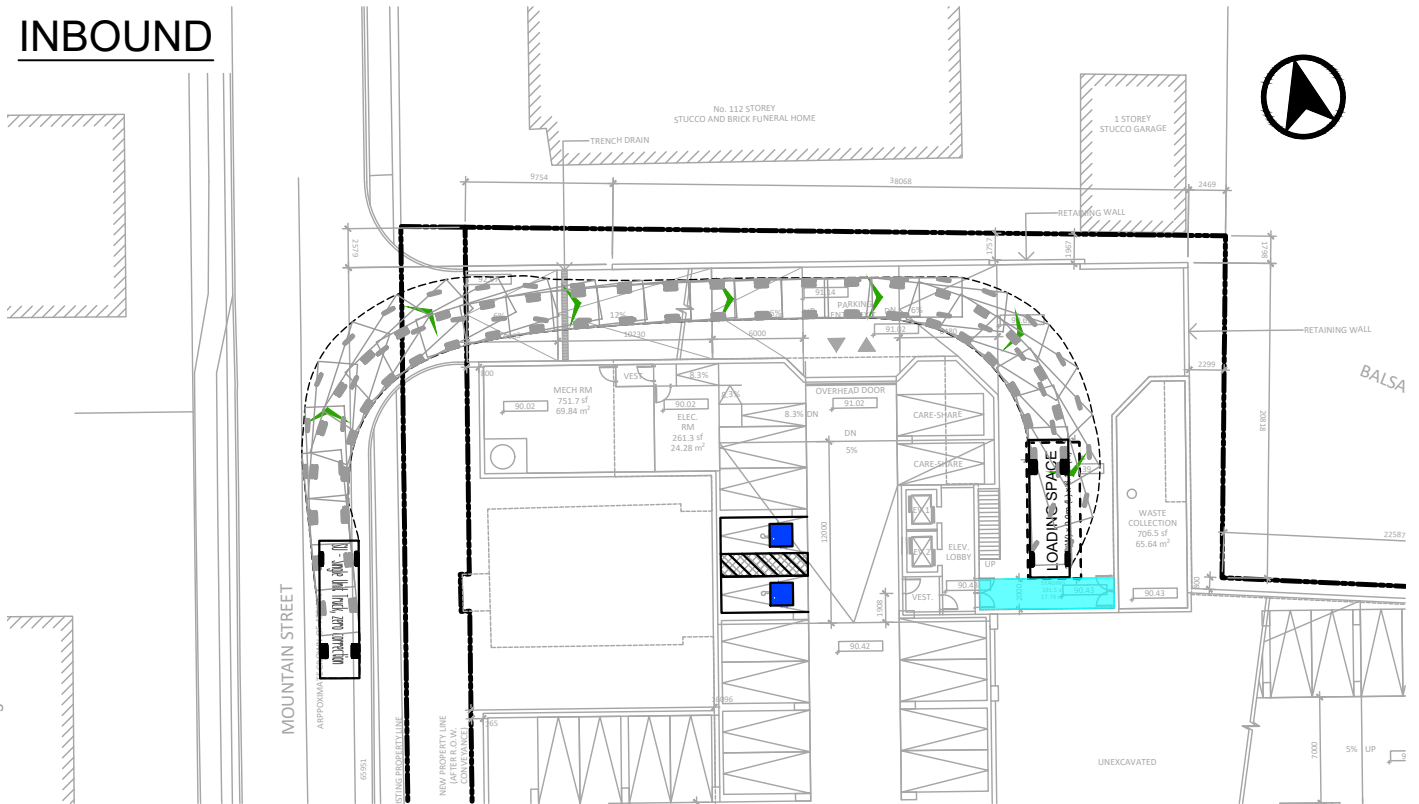
Overall Length	9.330m
Overall Width	2.440m
Overall Body Height	4.021m
Min Body Ground Clearance	0.250m
Track Width	2.440m
Lock-to-lock time	5.00s
Wall-to-wall Turning Radius	11.700m



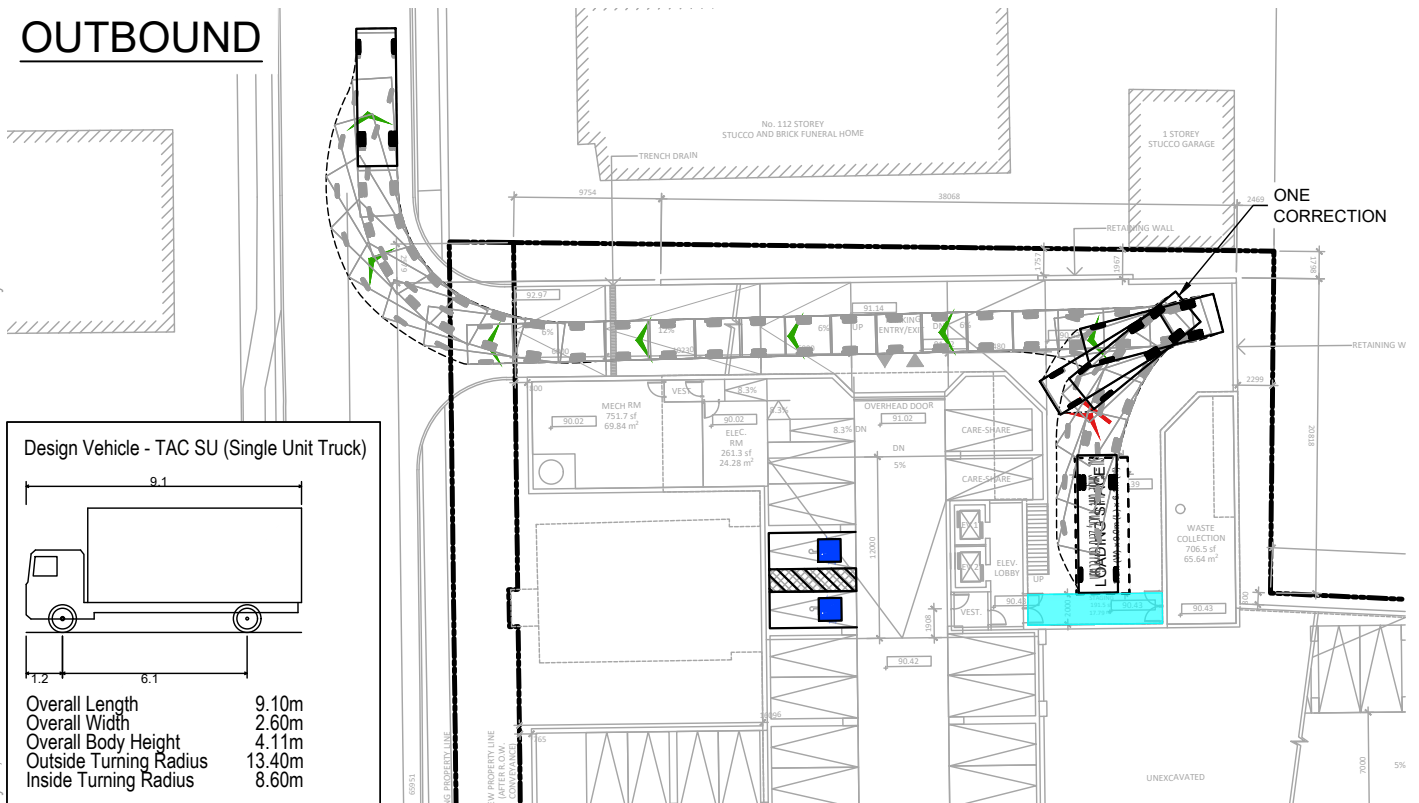
13 MOUNTAIN STREET, GRIMSBY VEHICULAR MANOEUVRING DIAGRAM LOADING SPACE - TURTLE ISLAND WASTE COLLECTION TRUCK

Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	VMD-01

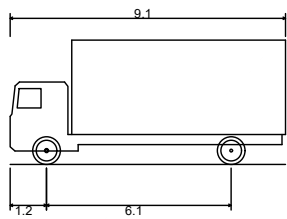
INBOUND



OUTBOUND



Design Vehicle - TAC SU (Single Unit Truck)



Overall Length	9.10m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	13.40m
Inside Turning Radius	8.60m

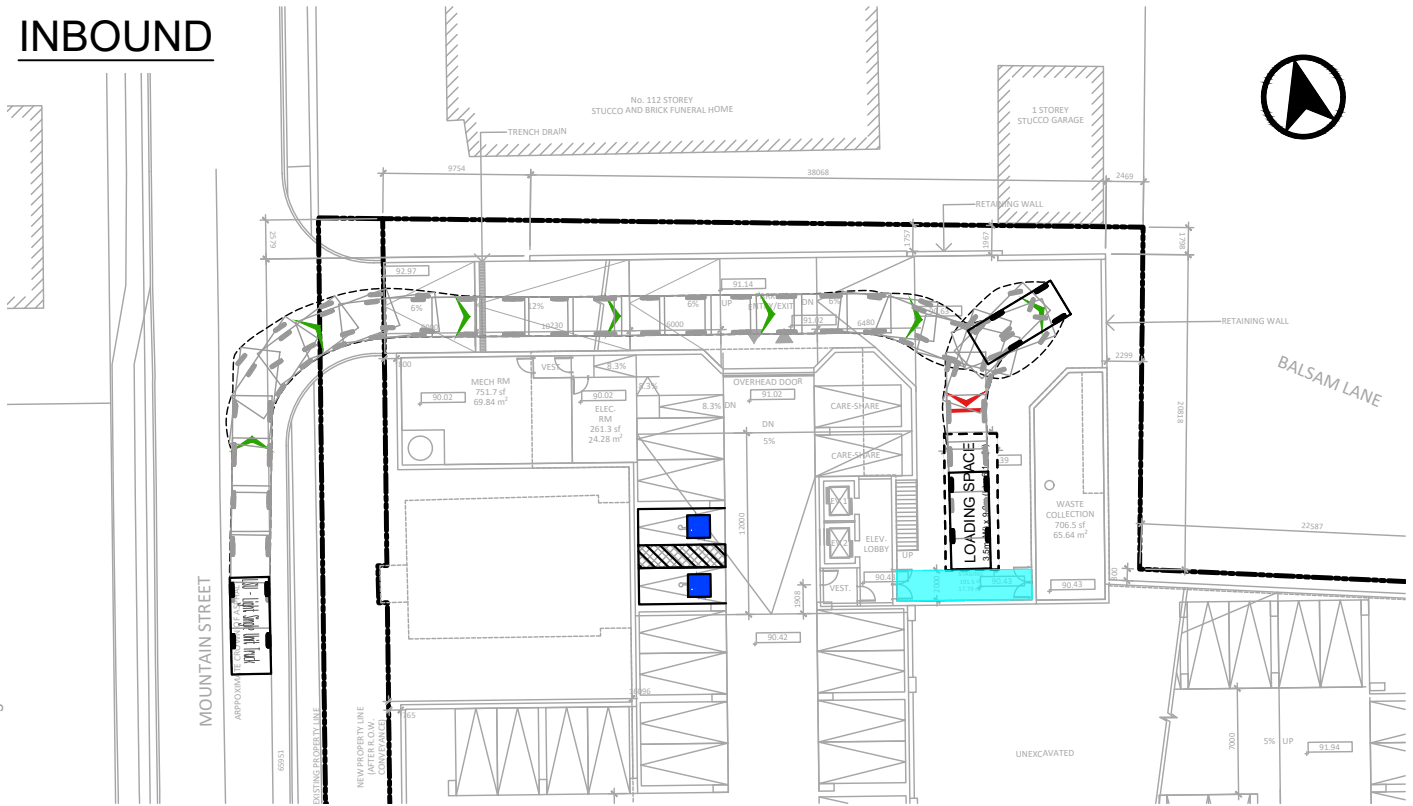
A graphic scale bar for a 1:500 scale. The bar is divided into five equal segments, each representing 4 meters. The segments alternate between black and white. Above the bar, the numbers 0, 5, 10, 15, and 20m are marked at the segment boundaries. Below the bar, the word "Scale" is written.



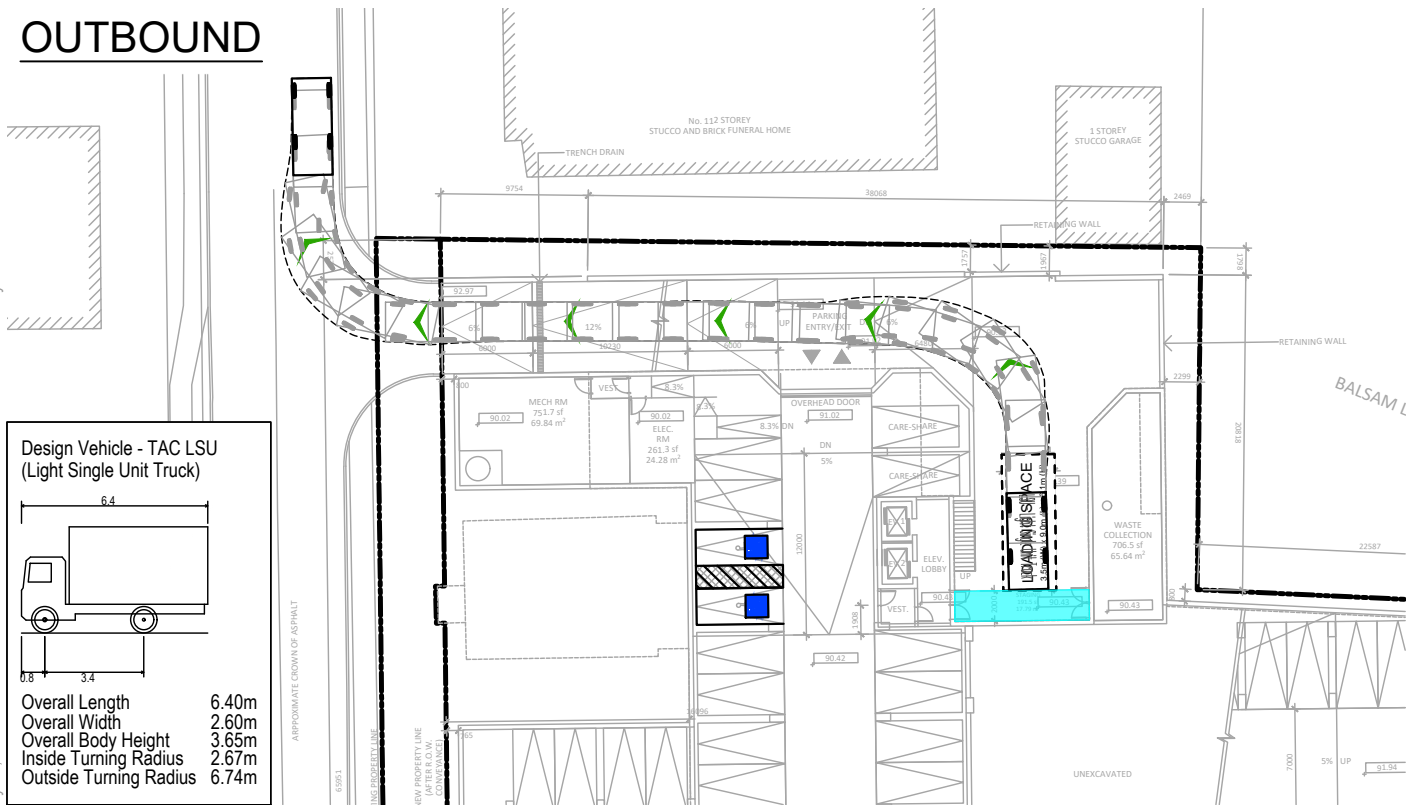
13 MOUNTAIN STREET, GRIMSBY
VEHICULAR MANOEUVRING DIAGRAM
LOADING SPACE - TAC SINGLE-UNIT
VEHICLE

Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	VMD-02

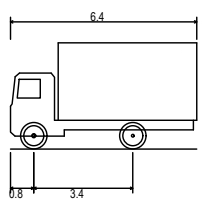
INBOUND



OUTBOUND



Design Vehicle - TAC LSU
(Light Single Unit Truck)



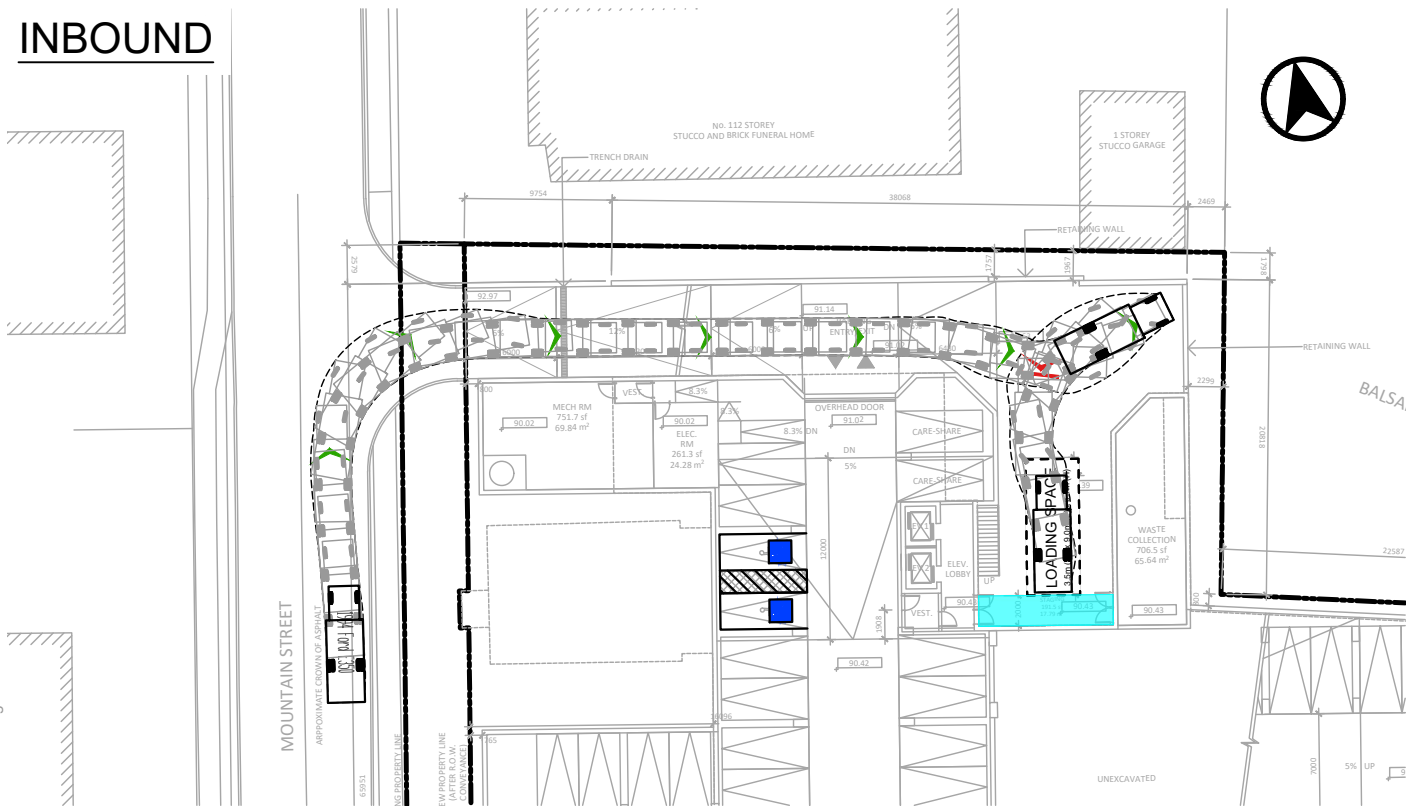
Overall Length	6.40m
Overall Width	2.60m
Overall Body Height	3.65m
Inside Turning Radius	2.67m
Outside Turning Radius	6.74m



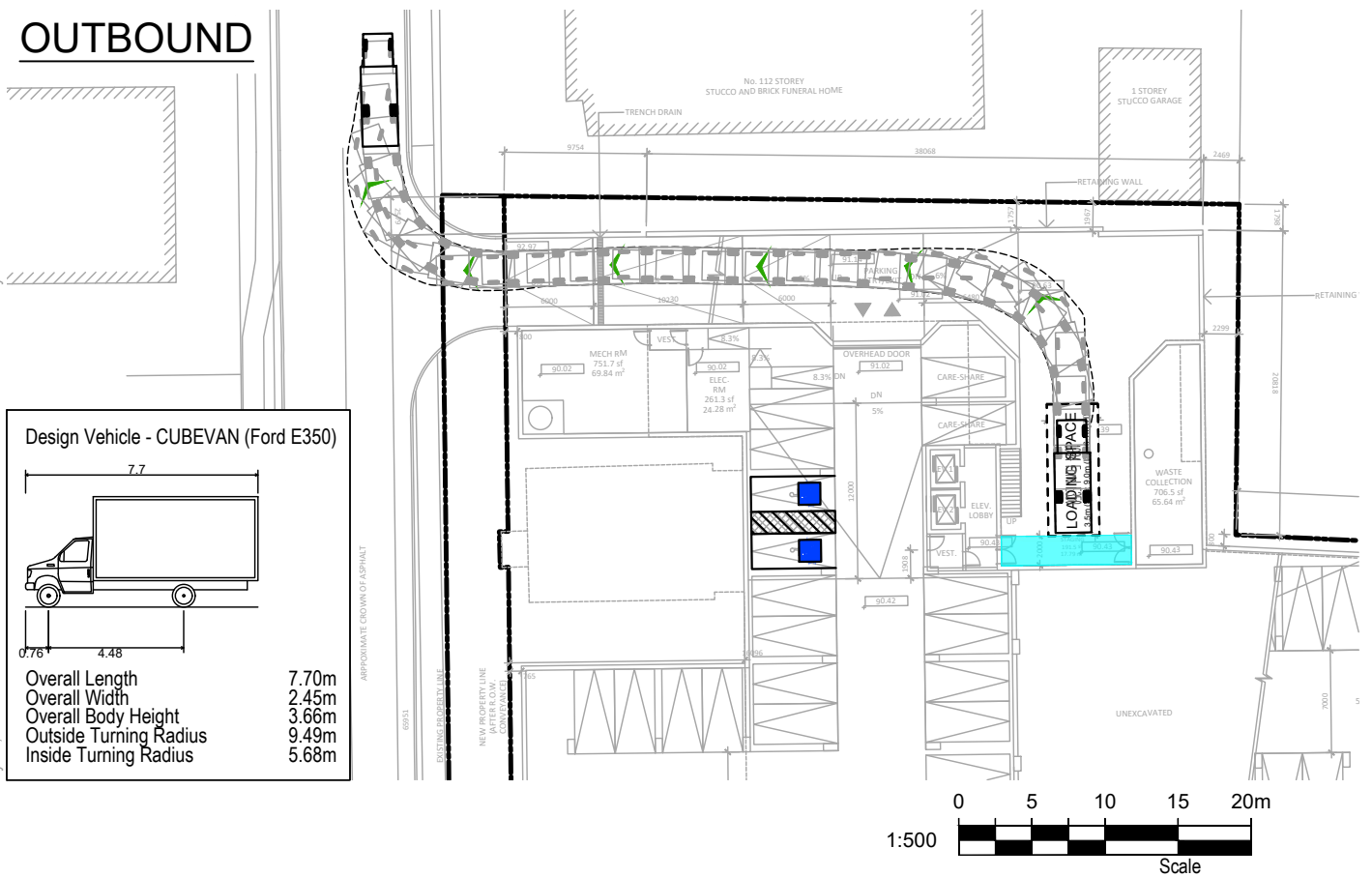
13 MOUNTAIN STREET, GRIMSBY
VEHICULAR MANOEUVRING DIAGRAM
LOADING SPACE - TAC LIGHT SINGLE-UNIT
VEHICLE

Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	VMD-03

INBOUND



OUTBOUND



13 MOUNTAIN STREET, GRIMSBY
VEHICULAR MANOEUVRING DIAGRAM
LOADING SPACE - CUBE VAN FORD E350

Project:	13 MOUNTAIN STREET
Project No.	6541-20
Date:	MAY 16, 2025
Revised:	--
Drawing No.	VMP-04

Appendix J:

GBF Community Services Group – Affordable Housing Letter





Food | Housing | Health | Youth

May 05, 2025

Re: The Woolverton, located at 13 Mountain and 19 Elm Street – Castlepoint Numa build

GBF has a long history of caring for the wellbeing of the Town of Grimsby. Our current location (40 Elm St.) geographically positions us to provide our services in the “Heart of Grimsby”. As a social enterprise, we see ourselves as a business that promotes wellness in our Town. With the support of donations from generous residents and a thriving retail business, GBF continues to grow and provides an important social service that is essential to our community’s wellbeing.

GBF Community Services has been providing financial assistance to low-income households for several years. We have invested over \$1,463,110 in housing support in Grimsby from 2021 to 2024. This is a 76% increase in financial housing support.

GBF recognizes that homes are anchors in our local community; they are the basis for safe and secure neighbourhoods that benefit us all.

While we continue to advocate for affordable housing in Grimsby, our immediate focus is to increase awareness about how important it is to fill the current housing needs gap and ultimately prevent homelessness. GBF Community Services is doing its best to address this need; we currently provide monthly rent supplements to approximately seventy households. In addition, we have provided Emergency Housing Financial supports to keep people housed.

However, we are acutely aware that there are limited options for those seeking housing in Grimsby. Harley Valentine is committed to bringing affordable rental housing opportunities to this Town. In our experience, we have found that many of the individuals requiring affordable rental housing rely on taxi and/or NRT services as their means of transportation.

GBF has a passion for supporting a community that enables everyone to be well. We believe The Woolverton would be a positive contribution to achieving this impact; it would bring a compliment of affordable rental opportunities to those seeking housing.

Yours Sincerely,

A handwritten signature in black ink, reading "Irene Podolak". The signature is fluid and cursive, with the first name "Irene" being more prominent.

Irene Podolak, President

A handwritten signature in black ink, reading "Stacy Elia". The signature is written in a cursive style, with the first name "Stacy" being more prominent.

Stacy Elia, Chief Executive Officer